PACKAGE engineering

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Barrier coatings in packaging laminations

How the control of wax migration contributes to package effectiveness by preventing the loss of the barrier properties inherent in the wax — with attention to their application in "problem" products. (See page 11)

Nitrogen packaging of pouches

What it takes in the way of equipment, methods, and a testing program to insure a packaging atmosphere of ¾ths of 1% oxygen in order to provide a resulting oxygen of not over 2% in the completed package. (See page 14)

Engineering an aerosol packaging line

Tracing the factors contributing to the successful engineering and operation of a complete line, including the details of bulk handling of propellant and the effective management of equipment and manpower on the line. (See page 22)

Complete table of contents on Page 2

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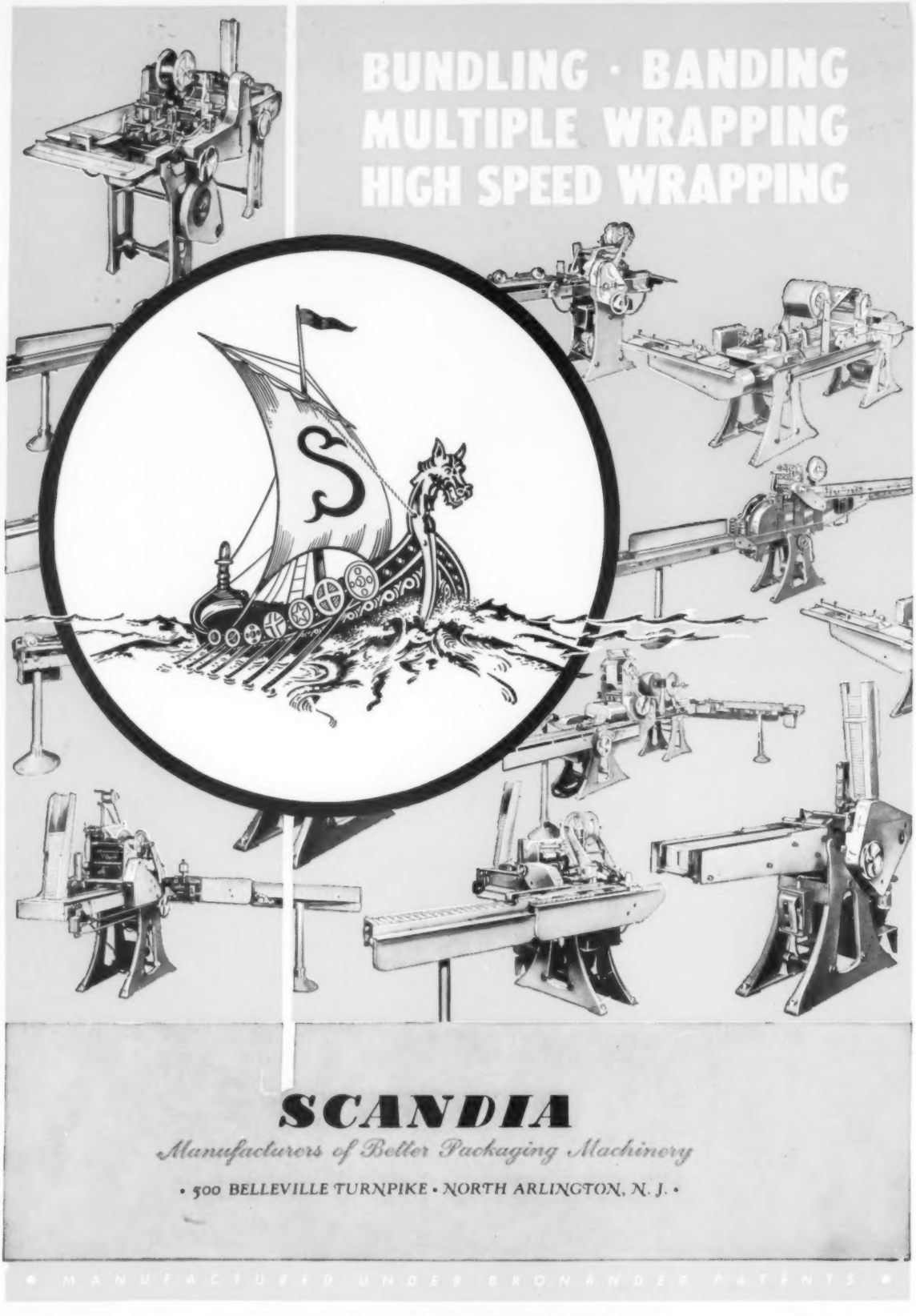
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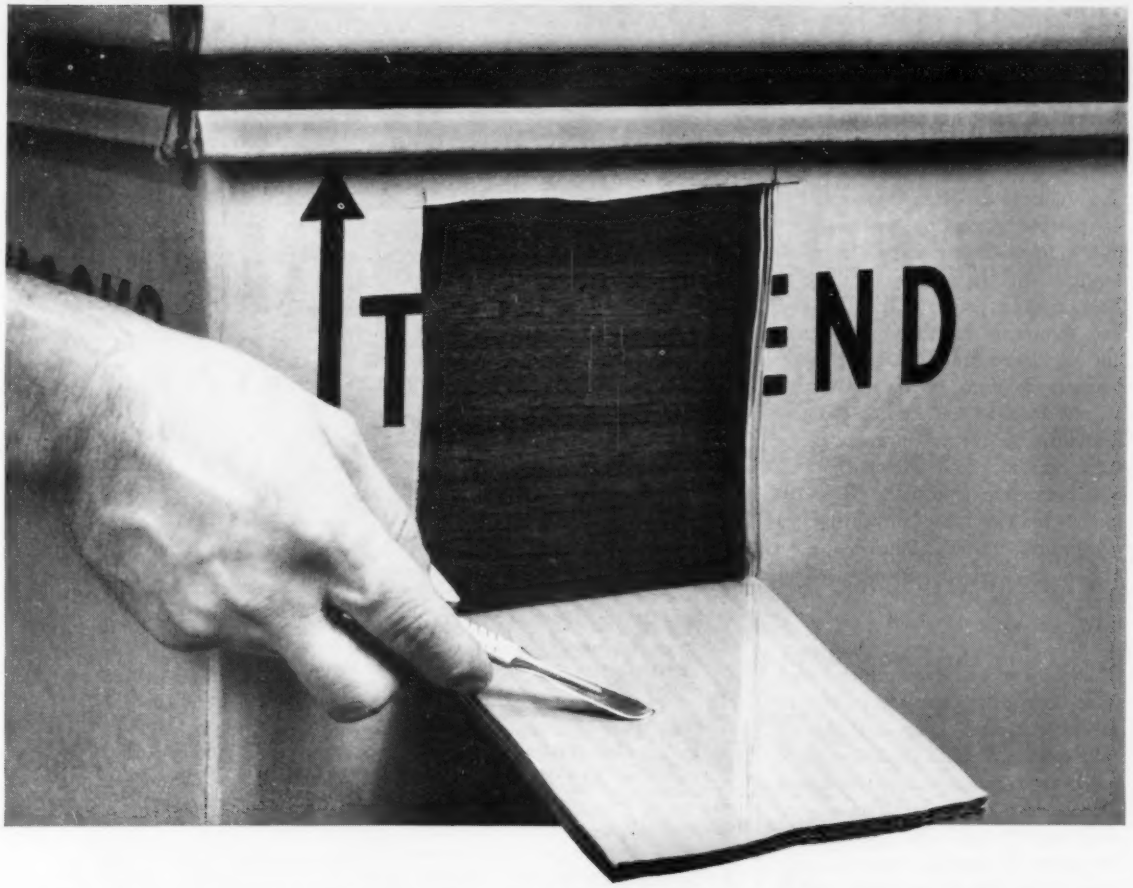

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PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

A look ahead

The measuring of gas transmission of flexible packaging materials in pouch form has received the close scrutiny of C. L. Brickman, Standard Packaging Corporation. In a detailed and significant article to appear in our next issue, Mr. Brickman reviews his methods of measurement. His article also includes test data on the permeability of oxygen through fabricated pouches of commercially available packaging materials. These illustrate his methods of measuring gas permeability through fabricated bags or pouches and support his conclusions.

Problems of quality control of multiwall bags get thorough discussion in an article by D. J. O'Connor, Morton Salt Company. Mr. O'Connor's observations emphasize the current lack of devices to evaluate bag performance prior to use. He urges the development of tests that users and suppliers alike can use as quick checks on bag quality. His article includes a listing of visual quality control considerations entailed in bag evaluation. His discussion of the inconsistency of results attained with current tests should stimulate the interest of all concerned in the development of adequate testing.

After moving into a new single story plant, Daniel W. Mikesell, Inc. faced the problem of delivery of empty shipping containers for its potato chips to its packaging lines. In an article soon to appear, James R. Fellows, Mikesell vice president, tells how his organization and its suppliers came up with a continuously moving conveyor to deliver empty cases as needed to the packaging line. A special feature of the system is the use of hooks on which containers ride. If not removed, they continue riding around the conveyor, and thus do not pile up in packaging areas.

—R.B.H.

Contents

11 **How barrier coatings enhance packaging laminations,** by Carl A. Ireton, vice president, technical division, The Specialty Papers Company
An authoritative discussion of the contribution of protective coatings to the effectiveness of laminations — with special attention to such factors as the difficulties entailed in wax migration and the effective prevention of it as an aid to retaining the barrier values in laminations using wax.

14 **Using nitrogen in packaging one pound pouches**
Equipment operation and a related testing program used at Dean Milk Company to assure an oxygen content of not over 2% in the completed packages of its one pound pouches of soluble dairy product — with emphasis on precautions entailed in keeping out oxygen.

18 **Points to consider when mechanizing a packaging line,** by R. Bruce Holmgren, editor, Package Engineering
A compilation of the experience of the plant manager, plant engineer, industrial engineer, bakery chemist and quality control head, new product development experts, and plant superintendent of The Kroger Company's Cincinnati plant — all focused on the development and installation of a high-speed automatic packaging line.

22 **The engineering of aerosol packaging,** by Laurence V. Burton, consulting editor, Package Engineering
A penetrating discussion of the bulk handling of aerosol propellant and the detailed examination of a 264-foot long aerosol packaging line at Stanley Home Products, Inc., with special attention to quantitative factors conducive to engineering effectiveness.

30 **How to change to machine packaging of screws**
In spite of advantages gained through replacement of manual packaging of screws with a machine operation, Hart & Cooley Manufacturing Company had a number of adjustments and modifications to make — to successfully package items of irregular shape and with features such as screw points.

32 **Announcements of machinery and products**

38 **Industry literature available free**

43 **Classified advertising**

44 **What we think** (our editorial page)

Reader service card inside back cover

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A note from the Publisher

A year ago we had an idea — an idea for a magazine that would provide for packagers a publication devoted to the problems of package engineering and, for suppliers, an advertising medium that would provide blanket coverage of the entire packaging field at the package engineering level.

This issue of PACKAGE ENGINEERING is our 12th — it marks the end of our first year of publication. It has been a rugged year, but a satisfying year, in that we are publishing a magazine according to our pre-publication blue print and are accomplishing what we set out to do. It has been a year in which we have seen a lot of the country and little of our families. Representatives of the sales and editorial departments of PACKAGE ENGINEERING have been in 28 states — from coast to coast, and from the Gulf of Mexico to the Canadian border. Our original group of five has grown to seven. We outgrew our first office, and are bursting at the seams of our second office.

The greatest satisfaction of the year has been the rapid and enthusiastic acceptance of PACKAGE ENGINEERING on the part of our readers.

The response to our first issue — January — was phenomenal. Nearly 2000 readers communicated with us in one form or another after our first issue appeared, and an average of better than 1000 readers a month have continued to communicate with us by letter, our Reader Service Card or our Circulation Card.

Picking an editorial high spot for the year is difficult, as I believe our editors have done an outstanding job in persuading many of the most able packaging men in America to write for PACKAGE ENGINEERING as well as maintaining our high caliber editorial content in staff-written stories. That you find our editorial content helpful in your business is shown by the fact that 68% of our editorial content has been reprinted for readers, over and above that reprinted for suppliers.

Numerous universities have requested permission to use material appearing on our editorial pages. We have been reprinted in house organs. We have been used for background material on an American Management Association session, and at least one author has been requested to speak before a technical group to expand on the subject he wrote on in PACKAGE ENGINEERING. Two articles which have appeared in PACKAGE ENGINEERING grew out of the voluminous correspondence that flows between our editors and readers discussing articles which have appeared in our publication.

Our Reader Service, which provides a department for buyers to obtain further information on new developments or to receive copies of current industry literature, has attracted over 20,000 requests to date which have been forwarded to suppliers monthly.

The intensity of readership that this department dramatizes has been reflected in our advertising growth. Our first issue carried the advertisements of 33 companies, and an average of four new accounts a month started advertising schedules during the year.

We are happy our efforts have met with such success, and promise to improve PACKAGE ENGINEERING each year. We are confident you will approve of the expanded editorial program we have planned for 1957.

Angus J. Ray
Publisher

PACKAGE engineering

AN ANGUS J. RAY PUBLICATION

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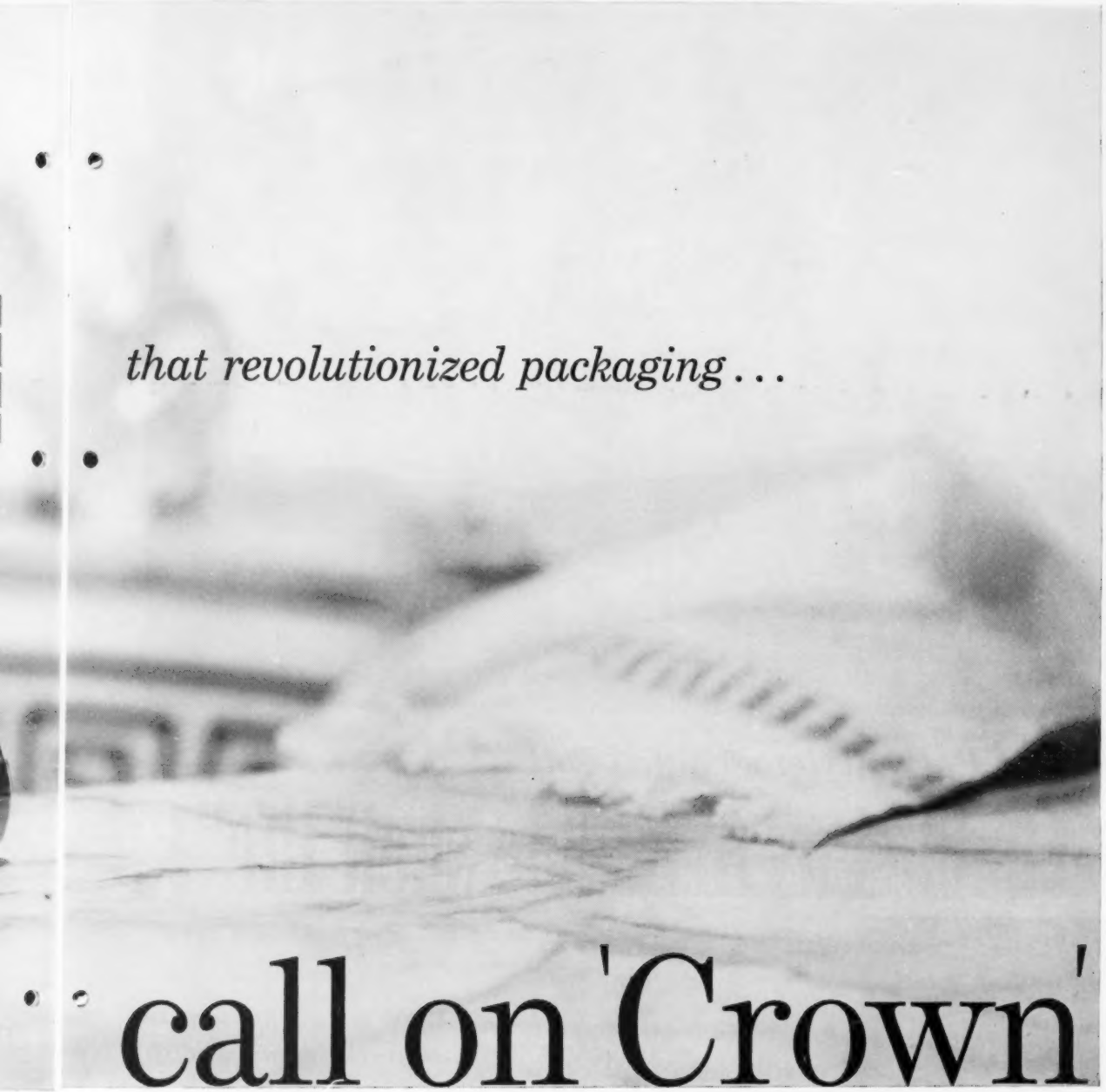

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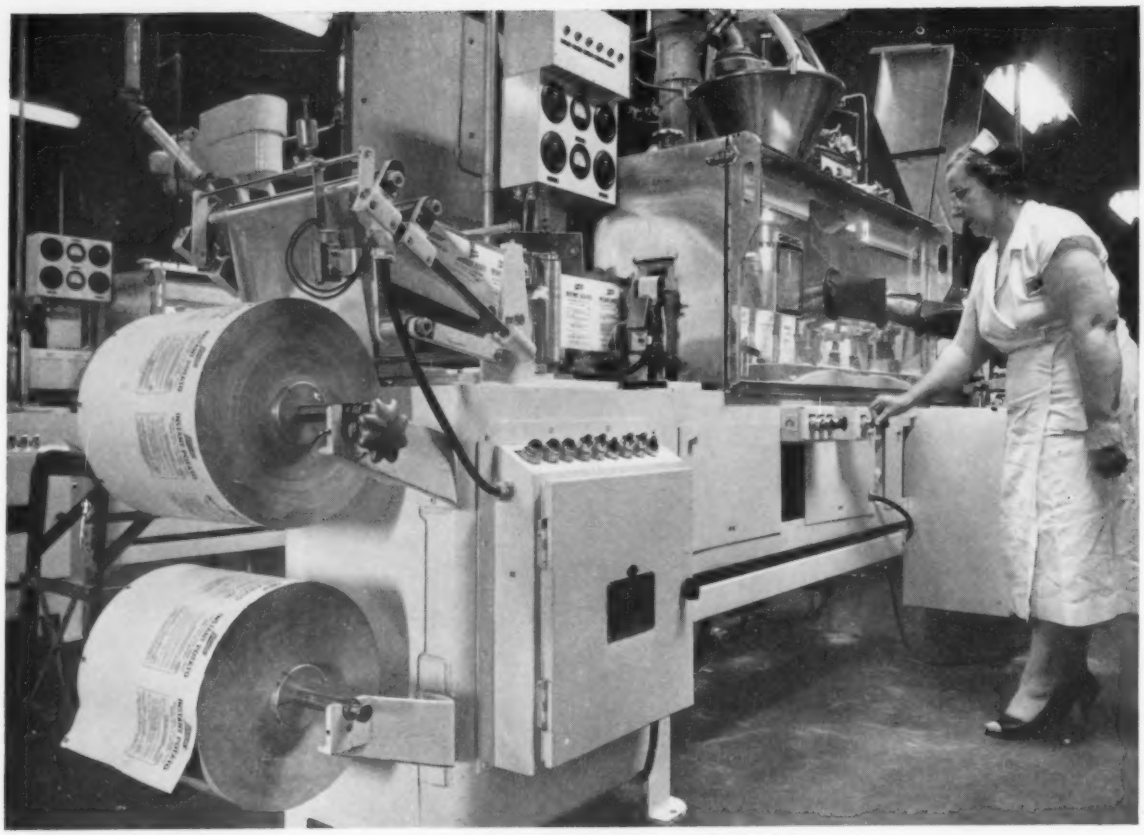

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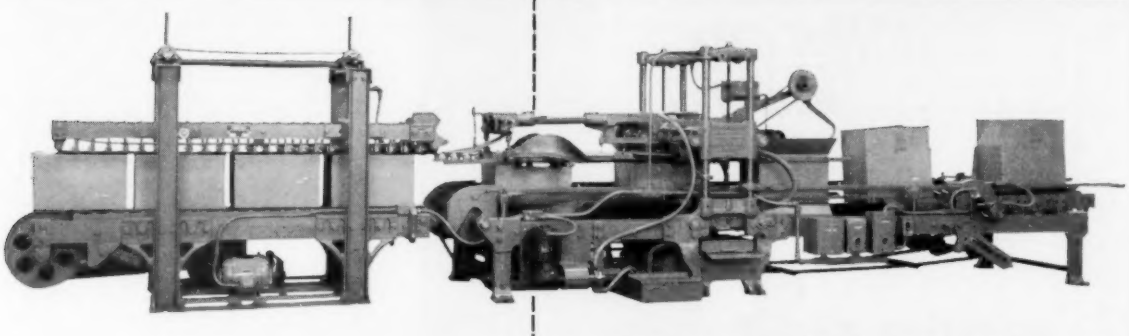

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Carl A. Ireton is a graduate of the University of Cincinnati, having studied chemical engineering. During his cooperative period while attending the university, he worked with the Standard Printing Ink Company, focusing his efforts on problems of inks, lacquers and related materials. Following his gradution he joined The Specialty Papers Company. During the intervening 25 years of his association with this company, he has served in numerous technical capacities and is currently vice president of its technical division.
Mr. Ireton is a member of TAPPI, Packaging Institute, the Dayton Engineers Club, and the Gravure Technical Association. Currently he is vice president of the latter group's packaging division.

Here is an unusual view of the contribution of protective coatings to the effectiveness of packaging laminations. Mr. Ireton's background provides unique qualifications on which to base a discussion of wax migration. In this article he summarizes the highlights of his findings and systematically relates the place of coatings to the problem of packaging laminations as a whole.

How barrier coatings enhance packaging laminations

By Carl A. Ireton
Vice President, Technical Division, The Specialty Papers Company, Dayton, Ohio

The combining of different flexible packaging materials to get a lamination incorporating the benefits of all of them in a single lamination is one of the most notable trends of contemporary packaging. An almost limitless number of combinations makes possible a degree of packaging precision unattainable a few years ago. But as important as the materials themselves are some of the coatings used to complement their protectiveness. It is hard, for example, to overestimate the value of microcrystalline wax as a barrier material — when used in combination with a wide range of films and papers, as well as aluminum foil.

When we speak of a wax lamination, we usually mean a film of wax 9 to 30 lbs. per ream. Typically, a ream consists of 500 sheets, 24″ by 36″, thus amounting to 3,000 square feet. In between the extremes of wax usage we find that the film required for good heat seal is about 17 lbs. per 3,000 square feet.

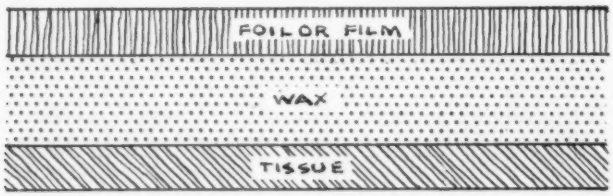
All waxes soften and then melt when they encounter an elevated temperature. As a result, when a wax coated or laminated sheet goes through the normal heat sealing operation of today's automatic packaging machinery the film melts and becomes fluid. This brings us to the problem of wax migration. It is amazing how much wax can migrate and lose its vital film characteristic of protectiveness when subjected to heat from the usual types of wrapping machinery. A sheet containing as much as 20 lbs. of wax coating might have virtually no protection — as a result of the wax migration.

Barrier To Migration

The usual solution to this problem is to provide a barrier that prevents the wax from migrating. In other words, by providing a barrier you control the direction of the flow of wax while it is in a heated condition. The control of flow rather than the mere migration is very important. If no barrier is present the wax can go both ways. This means that the heavier part of the laminated material would absorb wax like a blotter .

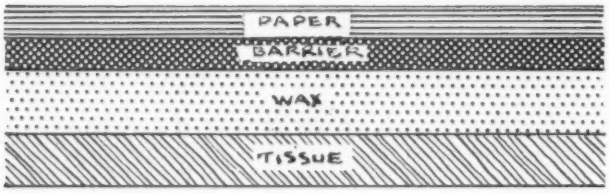
Temperatures in the range of 250 to 400 degrees F are encountered in normal heat seal packaging operations. Heat usually has to pass from the outside through the packaging material and then through the wax layer. This means that the wax nearest the outside melts first and, unless a barrier is present, will flow toward

Types of Combinations In General Current use

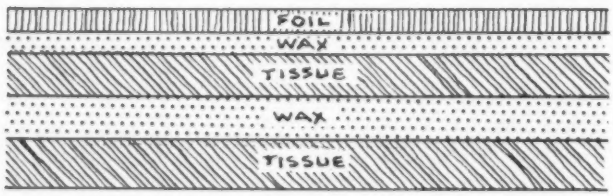


Cereal underwrap and carton wrapper (special usage)

Cookie or wafer carton wrapper or carton liner (i.e., cake mix, gelatin pudding dessert)



Soap and carton wrapper (general usage)



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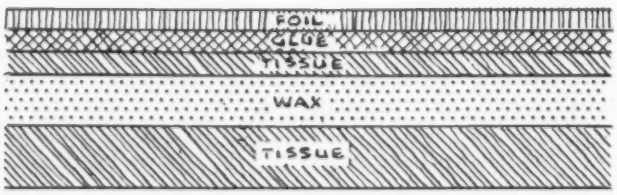


Carton and soap wrapper (general usage)

the heat source and away from the place where sealing and protection are needed. Staining and discoloration of the outer face of the package are also prevented by this method of retaining the wax.

We can control the flow of wax by increasing its viscosity. Our packaging lamination may include a combination of materials, such as wax plus resin plus plasticizer, or it may utilize wax, rubber, resin and plasticizer.

Where there is a barrier built into the lamination, the migration of wax can go only one way. Similarly, the heat is going only one way. As a result, the protective function of the wax is not lost because it has no opportunity to escape or migrate through the sheet. Unfortunately, if the wax migrates into the paper you lose not only the protection and the sealing properties, but also there is a considerable chance that delamination will occur. In choosing the barrier coating to prevent the migration of wax we have a wide range from which to select.

For example, foil is a natural barrier to wax and glassine, being greaseproof, likewise stops the transfer and migration. On the other hand, where paper is laminated with wax, we find that this wax penetrates the paper, saturates it, and eventually reaches the outer surface of the package. To prevent this we use any of a number of barrier coatings, such as lacquer, emulsion coatings, and others — applied either on the paper machine or by the converter.

Kinds Of Barrier Coatings

Barrier coatings may be lacquers, such as vinyl, nitrocellulose, or a chlorinated rubber base. Emulsions may be polyvinyl acetate, or other chemical or rubber latices. Currently we find that the polyamides are becoming increasingly popular.

Incidentally, wax makes its own contribution to the materials used with it. For example, even though aluminum foil has such functional characteristics as resistance to moisture, grease, odor, and gas transmission, it is subject to pinholing. It needs a wax to add further protection. The primary functions of wax include

sealing and moisture protection. Where aluminum foil is used, for example, it must be mounted to paper. We might use a 16-lb. tissue for this. In such a case more wax is necessary because some of it is absorbed by the tissue. It is possible that a coating of 25 lbs. per 3,000 square feet might be necessary instead of merely 17 or 20. Likewise we must consider the relationship of the glue between the paper and the foil.

Machinery Operational Problems

In addition to controlling the migration of wax out of the sheet by providing a barrier, we also must consider the problems involved in using it on packaging machinery. Typically we use a porous material, such as a back-up sheet of tissue. This makes possible the winding of the wax coated material into rolls. If we did not have this layer of tissue the wax would stick to the next layer and makes it impossible to unwind from the roll.

By using this tissue we have a wax-free sheet and we have the advantage of glue sealing the material if desired. Also, we have a sheet that does not experience wax collection prior to the sealing point on the machinery. Without this protection wax may build up on the machinery as the paper passes over idler rolls, or as it slips over the guide bars. This is particularly a problem under certain temperature conditions. Because almost all of our waxes soften when exposed to elevated temperature, there can be a severe wax collection on machine parts. Fortunately, the use of a porous tissue solves this difficulty.

Frequently a package requires a high degree of opacity. If this is so, it is usually a simple matter to add an opaque material to the base paper or film. However, it may prove desirable to put additional opacity into the barrier material to obtain a higher degree of opacity, thus enhancing the appearance of the package.

Wide Range Of Materials

In looking at the different materials used in combination to make these functional laminations, we find they include aluminum foil ranging from .00025 to .001. Typically the foil is .00035. Glassine, as used in this way, is usually 25 lbs. per ream (3,000 square feet) but the range is from 20 to 40 lbs. The various papers usually entail 25 lbs. but the range is from 20 to 60 lbs. We find a wide choice in the type of paper available.

Thus, a typical packaging combination may include a 25-lb. paper, a 3-lb. barrier coating, a 17-lb. wax coating, 8-lb. tissue, making a 53-lb. wrap. Incidentally, the tissue itself may be as heavy as 12 lbs.

An interesting example of a specialized package is one used for gelatin dessert. Initially, it consisted of a 52-lb. material of two glassines with a 7- to 8-lb. wax coating between the glassines. This was replaced by a combination of glassine, wax, and tissue, totaling 47 lbs. A subsequent refinement brought the weight to 43 lbs., thus achieving a savings by reducing the package material weight from 52 to 43 lbs.

Similarly, there was a saving because one of two glassines was eliminated. This brought about a cost reduction. Of course, the nature of the product governs the materials selected and what is applicable to a gelatin dessert or a low-shortening food product may not be applicable to other products.

Whether we are talking about an inner wrap that goes between the product and the carton, or an overwrap which goes around the outside of a carton, the considerations are similar.

Know Product Properties

A paramount requirement is knowing enough about the product to be packaged to determine the packaging material specifications. Soap is a product that offers a number of packaging obstacles. It is slightly alkaline and is liable to discolor the wrapping material. It is susceptible to mold and its perfumes can be contaminated by materials getting through the wrapper.

The front side sheet for a soap wrapper must be one that does not draw and wrinkle when subjected to conditions of storage in a warehouse. A typical soap product has a 16% to 30% moisture content. As a result, the fibres of the wrapping materials swell in localized areas. They buckle and warp, which means that the paper containing these fibres must be closely controlled.

Similarly, the material must have the proper surface in order to provide for suitable decorative or merchandising copy, proper printing characteristics, ink absorption, ink anchorage, and the smoothness of printing surfaces. Likewise the material must be alkali-proof and mold-proof. In fact, all materials, including the ink, glue, barrier coatings, and other ingredients of the packaging material, must be unaffected by alkali and should be nonsupporters of mold growth.

The question of using a mold inhibitor is controversial. Some products require it, others do not. To date, it seems to have been successful only in the non-food items.

Soap—As An Example

Wax used for a soap package must be chosen with reference to its oil content. This is necessary because of the stain that often occurs when packaging materials are exposed to shipment or storage warehouse conditions. Some wax has a lot of oil and flows easily when heated.

Resin mixtures also must be considered and used or discarded in accord with packaging machinery requirements. The wax mount must be carefully controlled to prevent squeeze out at the folds, as well as seal overlap. Squeeze-out results in smearing the outside decorative surfaces, as well as imparting a disagreeable sticky feel to the outer surfaces of the package.

The porous tissue must be selected so that it permits some wax migration but still does not cling or stick to the soap surface. There must be a hard surface on the outside. Spots of heat seal material might prove important. Perforations or holes might prove desirable to allow the wax to bleed out through selected areas.

Where soap is involved there is sometimes discoloration due to a combination with nitrous oxide which may be in the air. We find a lot of variation in the nitrous oxide and its action. When considering soap pack-

(Continued on Page 41)

In developing a nitrogen packaging operation for an unusually large pouch, Dean Milk Company drew heavily on its previous experience with nitrogen packaging as well as on its background of research and product properties. It now has a production line operation and a testing program to evaluate the packages from this line. This article reviews Dean's experience and summarizes some significant precautions to follow in carrying out a nitrogen packaging operation.

Using nitrogen in packaging one pound pouches

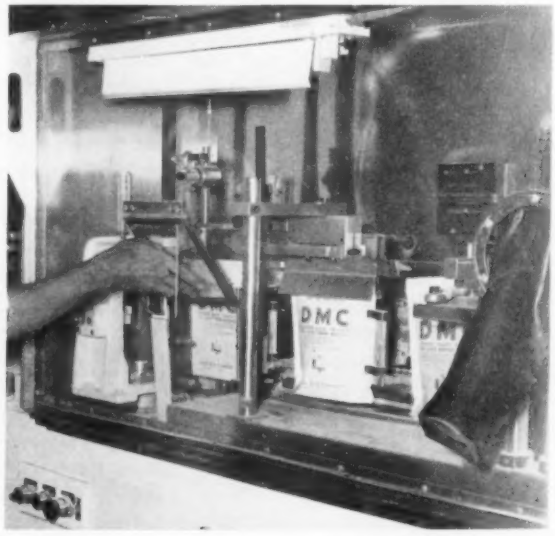
To extend the keeping qualities of its DMC and Perc-O-Lac, (packaged in one-pound packages), Dean Milk Company now handles these on a packaging line equipped with nitrogen facilities. Located at Dean's Rockford, Illinois, plant, this line is combined with a battery of tests — all geared to assure that the oxygen content of these packages does not exceed 2% in the final package.

DMC is a soluble dairy item that is a blend of sweet cream, modified solids from skimmed milk with added lactose, and di-Sodium phosphate. It goes into coffee-vending machines, and a major packaging objective is to extend its keeping quality. Having nitrogen instead of oxygen within the package contributes to this because it prevents the oxidation of the fat. By packaging and containing the product in an atmosphere as nearly devoid of oxygen as possible, the development of off-flavors caused by the oxidation of the fat is prevented.

Therefore, a primary requirement of the package is that it prevents the entry of oxygen. Other requirements

To provide an oxygen-free packaging atmosphere, the Dean plant packages DMC on this Bartelt unit. The Plexiglas housing prevents the entry of oxygen and the equipment provides for the entry of nitrogen before and during the actual packaging operation. Product feeds from an overhead hopper and completed packages discharge as seen at lower right.

A spring-loaded trap door permits quick entry into the Plexiglas housing. It closes and makes a tight seal as soon as the hand withdraws or it is no longer held open. In order to have an oxygen content of less than 2% in the completed packages, the plant maintains a packaging atmosphere containing approximately 3/4ths of 1% oxygen — within this housing.



include moisture-proofness and opacity. The latter is necessary because light induces off-flavors and oxidative deterioration.

Its previous experience in nitrogen packaging of products in tins and its background of research into its product led Dean to establish as a packaging requirement an oxygen-content of not exceeding 2%. This refers to the equilibrium value found in the completed package.

A certain amount of oxygen is entrapped within the powder particles. In the course of filling and packaging it takes a certain length of time to reach equilibrium. By the time the entrapped oxygen diffuses into the head space of the package, its oxygen content has increased. Because of this it is necessary to do the packaging in an atmosphere containing approximately 3/4ths of 1% oxygen. Therefore, packaging takes place within an enclosed hood into whose area nitrogen feeds.

The present material for these pouches is a lamination consisting of 45-pound pouch paper, .0007 aluminum foil, and 140 M2 Pliofilm. Because of the large size of the pouch and the characteristics of the film, breakage can be expected during shipment — if rough handling is encountered. Dean is in the process of running shipping tests in various types of shipping containers to determine these requirements.

Prior to packaging the product is dried by means of a spray drier, after which it goes into metal drums which are evacuated and filled with nitrogen. The next operation is the sifting of powder — during which interval the equipment bleeds nitrogen into the contents through the sifter. From here the product goes into a nitrogen hopper in which the oxygen is purged —prior to packaging.

The Dean plant receives nitrogen in standard cylinders, each containing approximately 230 cubic feet of nitrogen. Twelve cylinders bank together and connect to the main header. A gauge at this header indicates the nitrogen level. When its reading is low, the plant attendants hook in another bank of twelve cylinders to assure an adequate supply of nitrogen.

An important consideration is the pressure on the main nitrogen line. At least 40 pounds pressure is necessary in order to purge the entire system of oxygen and assure an adequate flow and distribution of nitrogen. The entire operation requires 450 cubic feet of nitrogen an hour. Orifices on individual lines and the pressure applied at them varies with the requirements of that particular point of the system.

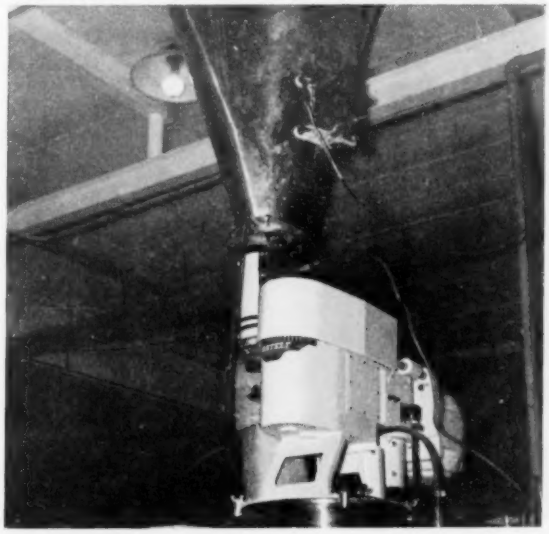
Principal equipment of this packaging line is a Bartelt unit equipped for nitrogen packaging. It has a Plexiglas hood, provides for the entry of nitrogen, and is designed to keep out the oxygen. It is necessary to maintain an oxygen content of 3/4ths of 1% within the Plexiglas hood in order to assure an oxygen content of not to exceed 2% within the package after equilibrium takes place. The line is equipped with a Beckman oxygen analyzer in order to verify the maintenance of the 3/4ths of 1% figure.

Similarly, there is an Orsat gas analyzer located in back of the Bartelt equipment. Purpose of this unit is to determine the oxygen and carbon dioxide content. It serves as a check on the Beckman unit and is used from time to time during a run. Special features of the packaging equipment include devices designed to retard the entry of oxygen. For example, there is a spring-loaded Plexiglas trap door.

Likewise there are two entry points, each equipped with a heavy rubber sleeve — at the end of which is a

Long rubber gloves permit adjustment of packaging equipment without exposing the protected atmosphere to the entry of oxygen. An attendant easily checks his adjustments at the filling point because the use of a long glove gives him a range of flexibility. Visible to the immediate right of the attendant's head is a Beckman oxygen analyzer, used to check equipment performance.

Before packaging, the DMC goes into a nitrogen hopper from which the oxygen is purged. From a central control point nitrogen feeds into the packaging equipment — such as seen at this hopper. There must be at least 40 lbs. pressure on the main nitrogen line in order to purge the entire system of oxygen. This entire operation uses 450 cubic feet of nitrogen an hour.



rubber glove. An attendant puts his arm into the sleeve and his fingers into the glove in order to adjust and handle equipment within the Plexiglas housing. This makes it unnecessary for him to expose the area inside of the housing to oxygen while he is making adjustments. Also there is a protected opening through which completed packages discharge as they leave this unit. There is little difficulty at the other end where the web of packaging material enters. This opening is very narrow.

As the package stock feeds from its roll into the machine, a gusset is formed while the pouch stock is laterally folded along the center of the roll. Next it is registered, goes into the machinery, and a vertical or side heat seal is formed. Following this, the equipment cuts free each individual pouch by making a cut along its vertical heat seal. A blast of nitrogen (rather than air) goes into each bag to open it for filling.

There is a vibrator on the machine to vibrate down the contents. This is necessary to keep the powder out of the horizontal heat seal area. If powder particles get into this area, the heat seal does not take place properly. Heat sealing bars are Teflon coated to prevent sticking. After heat sealing the package is passed through cooling bars (with water running through them) to lower the temperature immediately. There is an electric eye to center the heat sealing action.

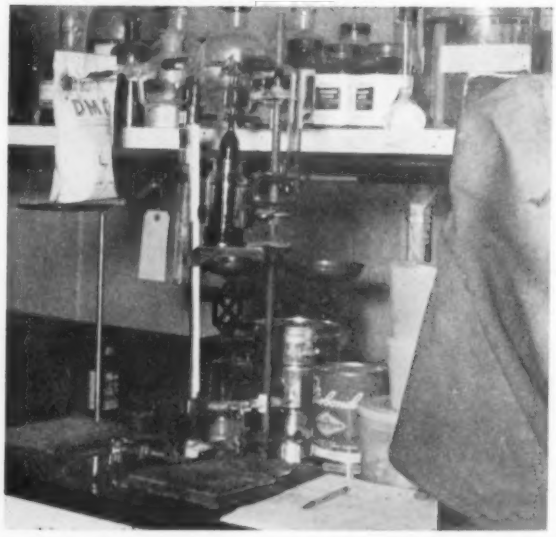
In the course of the package forming and filling operation, there is a series of nitrogen applications: Instead of the usual blast of air to open an individual pouch prior to filling it with product, there is a blast of nitrogen. As a result, when the fill of product into the pouch takes place there is an upward surge of nitrogen into the powder being filled. Since this takes place as the powder goes in, it aids in removing residual traces of oxygen from the pouch. Primarily the product is subjected to nitrogen prior to entering the pouch — to purge out the oxygen. In addition to these sources of nitrogen, there are two outlets which supply it to the area enclosed by the Plexiglas hood.

This Dean packaging line is geared to handle 30 one-pound bags a minute. However, a normal operating speed is somewhat lower, such as 24 a minute. Speed varies with the particular product being handled and this in turn depends on how rapidly the machine can fill it by means of the auger type filler. During a run attendants check weigh approximately every 100th package. Adjustments to vary the weight of package contents may be made without stopping the machinery.

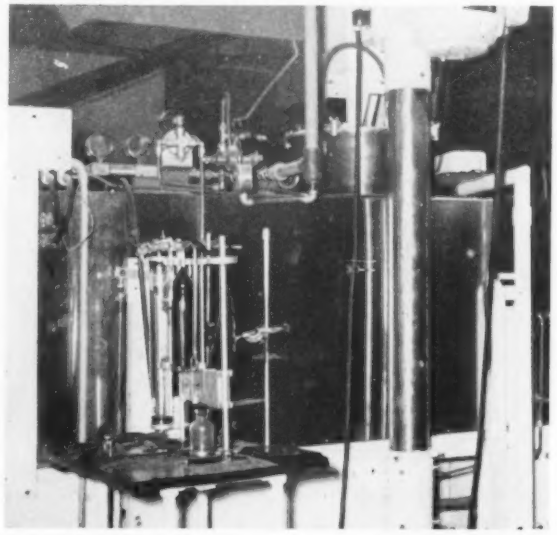
A major aspect of the testing of completed packages involves immersing them in water, which is then subjected to vacuum. Dean standards prescribe that every package withstand up to 20 inches of vacuum under water. In spot checking samples, attendants can quickly spot any leaks in packages because bubbles appear immediately where a leak is present.

The Dean organization also uses a laboratory test to check the nitrogen within a package. This is done to determine that its oxygen content does not exceed 2%. The laboratory uses a modified Orsat sampling device that takes the gas out through a hypodermic needle. A self-sealing rubber disc, adhered to the package prior to the insertion of the needle, prevents any entry of oxygen at this point. Once the disc goes into place on a package, a hypodermic needle is injected into it through the disc. By means of the needle the nitrogen from the package moves through a tube into the analyzer. At this point the attendants proceed with the usual laboratory test to determine oxygen content.

Using a modified Orsat sampling device that takes the gas out through a hypodermic needle, the Dean laboratory tests completed packages to determine that their oxygen content does not exceed 2%. There is a self-sealing rubber disc used where the needle enters the package. This prevents the entry of oxygen into the package.



This Orsat gas analyzer stands in back of the packaging equipment. It determines the oxygen and carbon dioxide content and serves as a check on the Beckman unit. The attendants make tests from time to time during the course of a run. Use of nitrogen in packages prevents oxidation of the fat in the product, thus extending its keeping qualities.



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In planning and installing a single automatic packaging line to replace a number of manual and semi-automatic operations, even a company with as broad a packaging background as The Kroger Company runs into new considerations. This article is a compilation of the experience of the plant manager, plant engineer, industrial engineer, bakery chemist and quality control head, new product development specialist, and plant superintendent, as well as the company headquarters, engineering and merchandising staffs. Their views when synthesized comprise a number of important guideposts in the planning of a packaging line. Their suggestions are the result of hard-won experience and deserve attention by any company planning to install a new line.

Points to consider when mechanizing a packaging line

By R. Bruce Holmgren
Editor, Package Engineering

When changing conditions in the cracker and cookie market prompted The Kroger Company to step up its production of dump filled cookies and cracker cartons, those concerned with packaging these products at Kroger's Columbus, Ohio, plant undertook development of a mechanized operation. They saw that an automatic packaging line would be necessary to replace a number of manual and semi-automatic packaging sequences. But before mechanization could become a reality, a number of factors, such as package standardization, required attention.

Kroger's existing packages for these products entailed a wide variety of carton lengths, widths, and heights. Change-over requirements of any automatic packaging line dictated a simplification — particularly of the horizontal dimensions. Adjustments of height are easy to make and involve perhaps 30 minutes — in contrast to a period from several hours to a full day for changing the horizontal (length and width) adjustments.

The products to be packaged on this line had grown up over the years, each with their own package specifications. Because of the relative ease of adjusting the different closing and overwrapping machines used about the plant, there was no particular premium on standardization. Further, many of the size variations had their origin in competitive or price situations in the cracker and cookie market. Thus, aside from the question of length of run, one of the basic steps was to reduce carton dimension variables to a minimum.

As a result of a simplification study, the Kroger plant standardized on just two sets of horizontal (length and width) dimensions to cover all of the packages handled on the mechanized line to be installed. How it got that simplification represents a practical application of packaging know-how.

Problems Of Bridging

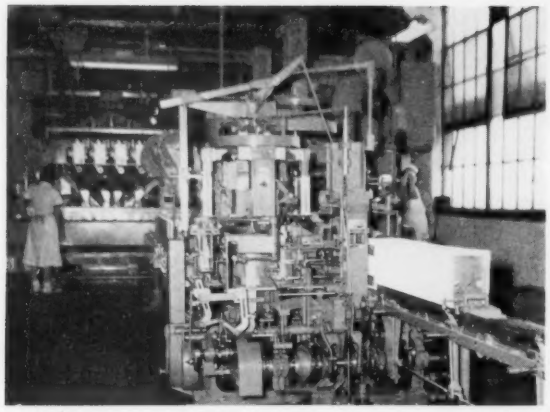
The starting point of the project was to take one carton at a time and try it with all of the products to be packaged on the new line. This immediately introduced the problem of bridging—where crackers or cookies stick or block the entry of others into a carton. This is no problem with items like oyster crackers, but where larger cookies or crackers are involved it must be considered.

The Kroger packaging specialists found that by taking the diameter of a maximum size cookie plus a maximum thickness they could determine the theoretical clearance. As a safety factor they added approximately 1/16″ for added tolerance. This extra space within the carton precluded any possibility of crackers or cookies sticking or blocking while being fed into a carton. In this connection it is important to use maximum and not merely average diameters and thicknesses.

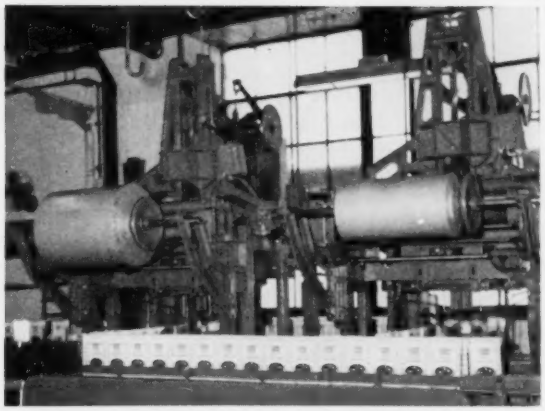
Kroger's quality control laboratory made its own sample cartons where necessary for this project. As a result of trial and error experimentation, they developed a set of alternative proposed standard cartons.

In addition to those responsible for technical packaging details, company merchandising executives also participated in the planning process. Because of their responsibility in having packages that would sell effectively on retail store shelves, their judgment carried considerable weight. During the simplification process they tried the various approved surface designs on the proposed packages.

Also, the merchandising executives had to settle upon the structural and functional details of the cartons, such



Start of Kroger's new packaging line is this Pneumatic Scale high-speed carton feeder and bottom sealer. This machine expands and sets up the individual cartons so that the inner liner may next go into it. Complexity of machinery puts a premium on adequate maintenance, including proper lubrication.



These two Pneumatic large lining machines automatically form and insert the liner paper into each carton — to prepare it for the filling operation. An overhead hoist facilitates the movement and positioning of roll stock for these two machines. Cartons moving from right to left (at far left) are ready for filling.

as openings, scorings, flaps, and the like. They considered about 15 different possibilities suggested by the manufacturer of the packaging line machinery.

Transfer Of Product

Thus, all executives concerned with the project settled on the physical dimensions of the packages, including quantities of fill, before turning to the operational details of the line itself. After determining these dimensions, the next problem was to consider the transfer of product from the band ovens to the packaging line. This introduced several technical problems, including those of product cooling. A difficulty was that many of the items leave the ovens with a temperature above that of the melting point of the wax used in the waxed glassine liner of the cartons.

This focused attention on the need of a proper cooling system. The types of problems the Kroger engineering and operating group encountered in this situation should be of interest to others faced with similar questions. More important than the quantitative details are the methods or approaches used to find the answers.

For example, the Kroger engineers had to consider the length of belting used, the type of belting, the different choices of delivery speeds, as well as such questions as closed coolers versus open coolers — and the use of fans or heaters. One approach was to time the various items on the existing conveyors in order to find the rates of cooling in terms of degrees of cooling per foot of belt.

A parallel consideration was to verify the melting point of the wax used in the liner papers. Still another problem was the effect of the cooling on the products themselves. Certain kinds of crackers tend to check but by developing a conveyor and delivery system with all factors considered, the Kroger plant has experienced no checking of these products which otherwise are vulnerable to checking.

In selecting the packaging line equipment the plant found it helpful to run flow figures on the different products coming out of the ovens and then calculating these in terms of pounds per minute as well as packaging units per minute.

Choosing Items To Run

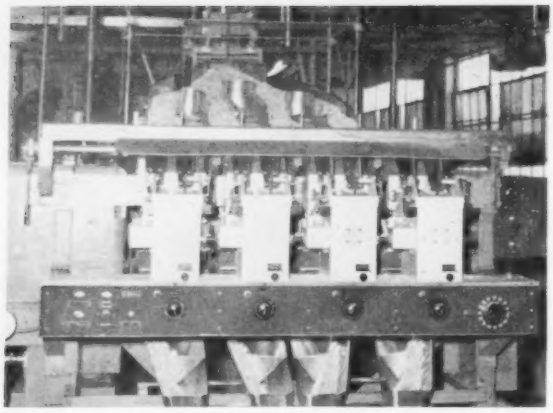
Underlying all of this planning was the basic consideration of what products the plant could afford to run on its proposed mechanized line. Obviously these had to be stable items so that the runs would be of reasonable length. It would be unrealistic to put short-run specialty items on a high-speed line requiring detailed change-over for each run.

In comparing one type of machine to another, and in comparing automatic versus semi-automatic and manual operations, the Kroger executive and operating group crystallized on its approach to mechanization: For example, the matter of package weight tolerance was extremely critical. Because of the close profit margin on these items, it would be easy to lose the company's profit due to excessive overweights.

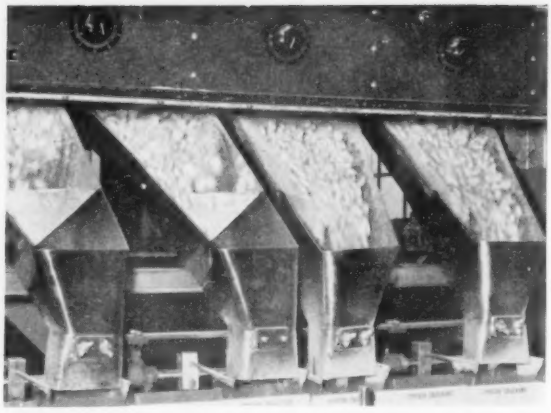
This dictated the use of machinery capable of critical adjustment. By comparison, with a hand operation it would be necessary to provide such a thorough check-weighing operation and allot so many people to the check-weighing work that the personnel usage would impair the profitability of the items being packaged.

Another consideration requiring study is that of break-even. Those concerned with this project point out the vital necessity of checking the break-even point for a particular operation. It is important to study the significant relationship involved with scheduling and change-over. The problem is that the length of time required for machine change-over could take away from productive operating time and thus interfere with an adequate return on the investment in equipment.

This places a premium on careful scheduling — such as making the change-over whenever possible during lunch hours or other non-productive time. The engineering and operating men point out that an impor-



Proper delivery of product to filling equipment was a major feature of the packaging line project. Plant engineers designed a conveyor system to deliver production from any of the band ovens to this Pneumatron. Adequate cooling of product prior to its going into packages received much attention.



Use of baffles in flow troughs leading from conveyors to Pneumatron and into filling operation indicates importance of product study. Both plant and supplier engineers worked out these baffles and related equipment modifications. The entire mechanization project involved full teamwork efforts — in advance of actual installation.

tant consideration is to avoid subjecting the theoretically available productive time to interference resulting from change-over.

Thus, the company made its selection and installed the line which consists of the following Pneumatic Scale Corporation units: One high-speed carton feeder and bottom sealer, two large lining machines, one Pneumatron four-scale cookie and cracker net weight weigher, and one straight line top closer. Having made these selections it then became the responsibility of the plant superintendent to prepare his crews for the arrival of the machinery.

Packages moving to the straight line top closer pass inspection and check-weighing. An important phase of this mechanization project was the selection and training of line workers — mechanically and temperamentally suited to high-speed packaging line work. Packaging employees had no previous experience with such equipment.

Explain Line To Workers

His experience in developing and consummating a two-fold educational program proves the importance of using care in introducing mechanization. The first phase of the program was to condition and prepare the operating personnel for the new operation. The second phase was to provide formal training of those assigned to its operation. The successful experience of the Kroger plant in introducing this fully mechanized line to a work force who had never experienced anything of that kind shows the importance of a full sharing of information.

The superintendent and his staff told the people just what was coming in the way of equipment and explained to them in detail just what it would do. They gave their people the best available figures concerning the productivity and operation of the line.

An important phase of this indoctrination program was to discuss the line in terms of what it would do for the company. It was necessary to explain some of the details of the competitive situation in the cracker and cookie markets and point out just how this equipment would contribute to keeping the company in a competitive position in this regard. In a nutshell, the superintendent and his group explained every conceivable detail to the people in the plant before the machinery arrived.

In selecting workers for assignment to the new line, the supervisory group had to consider their previous experience, mechanical aptitude, and general temperament. The latter was important in order to be sure of having people who could withstand the constant operation of high-speed, automatic machinery. As a result they selected the line operators and attendants with considerable care. However, many of them had a certain amount of mechanization experience due to their operation of semi-auto-

matic and individual units of machinery in the plant.

Package Material Changes

Introduction of the new line brought with it certain changes in packaging material usage. This focused the attention of the quality control laboratory on making suitable tests of packaging materials used. For example, high-speed automatic machinery places a premium on folding cartons with minimum variations of caliper, scoring, and other details.

Similarly, the use of roll stock for carton liners, in place of preformed cellophane and glassine bags, injected a new testing program. The standard practice is to test these materials in accord with TAPPI standards — as adapted to the particular requirements of this plant. As with other companies getting into a new type of operation, the plant is still developing its experience with product compatability — for example, the effect of ginger snaps on a glassine bag.

As operation got under way, the plant engineering group and the machinery manufacturer's representatives had to work out certain mechanical details. In order to provide a proper flow of items into the Pneumatron, it was necessary to put baffles in the flow troughs leading from the conveyors to the Pneumatron. This illustrates the importance of careful study of product movements to packaging machinery.

The plant engineer and his staff also had the responsibility of developing a system of conveyors. In keeping with the underlying necessity of maintaining flexibility, they have worked these out so that conveyors from any of the band ovens may feed to the automatic packaging line.

Positioning of the equipment itself was a major consideration. It was necessary to fit the line into the best available space from the standpoint of the units of machinery involved and, at the same time, it was necessary to position it with relation to the flow of product from the ovens. A vital consideration here was the matter of cooling.

As the industrial engineer and his staff point out, it is important to consider these operations not as single machines but as an integrated sequence involving a series of machines. Thus, any approach to mechanization should treat the operation as a totality rather than a set of isolated units.

Other basic considerations included those of flexibility and economic justification. Where equipment that entails several hours of change-over is involved, it is important to do a thorough job of long-range planning. For example, it is necessary to anticipate the market demand for certain items in order to restrict the high-speed line operation to products with a sufficiently long shelf life to avoid having to switch from item to item on the line. In other words, the runs should be as long as possible. If the shelf life is adequate, the packages can be completed and cased well in advance — able to withstand storage until moved into the markets.

One way to justify such a line is to compare the direct savings in labor on the existing line with the figures involved on the manual and semi-automatic operations being replaced. Even where product is brand new or one on which the plant has had no experience there should be no barrier to determining comparison. The plant management points out that it should be possible to find theoretical costs that pertain to the justification of the capital expenditures.

A parallel consideration was that of the addition of specialists. This may involve either a training program or the use of more highly trained specialists to replace less trained attendants. For example, a skilled mechanic may have to replace a semi-skilled operator or attendant.

Points to check in planning mechanization

1. Careful evaluation of the individual package and study of the particular problems of the product going into it are vital — since the needs of mechanization may demand package changes.

2. Where product cooling requirements are involved, it is important to coordinate equipment and product flow in the light of these needs in order to meet the speed requirements of the mechanized line — without putting products into packages while the product temperature is too high for the packaging material to withstand.

3. Installation of a highly mechanized line usually entails a complete review of planning and scheduling operations to work out combinations and runs geared to capitalize on the increase speed of operation.

4. Complete and thorough explanations of the mechanization project to packaging line personnel pay dividends in paving the way for a cordial reception of the equipment — thus replacing distrust and apprehension that otherwise might accompany its introduction into the plant.

5. Members of the management group need to consider carefully all of the pertinent cost comparisons. Where products are new and have not been packaged previously the best available figures should be used — because even estimates are better than no figures at all, and provide quantitative guides to decision making.

Here is a remarkably thorough discussion of the bulk handling of aerosol propellant and a close examination of a unique aerosol packaging line in operation. In this article Dr. Burton traces the development, installation, and use of the 264-foot aerosol line at Stanley Home Products, Inc. He also scrutinizes the technical and managerial thinking on which the development of this line rests.

The engineering of aerosol packaging

By Laurence V. Burton,
Consulting Editor, Package Engineering

A line speed of 110 aerosol units per minute is maintained steadily at Stanley Home Products, Inc., Easthampton, Massachusetts, with only twelve employees, counting everybody from the man who feeds the conveyor from can storage to the man who places the finished goods on pallets. Efficiency in the use of Freon propellant is very high, with propellant losses about only 6%. If current trials are successful the number of line employees may be reduced to a total of ten.

If you have been around many aerosol packaging plants, where the number of line-workers sometimes runs from about 15 to as high as 20, you can visualize that this is a very efficient line, both as to labor cost and product efficiency.

Such an operation was not easily developed but came about as a result of teamwork and much thoughtful planning by a group of engineers in the plant engineering department.

Plan Own Installation

To understand the engineering economics of this installation it should be realized that the study of aerosol packaging started in 1948 when the company began to realize that this form of packaging was growing very rapidly and that, sooner or later, it would need to do its own packaging of aerosol products. Up to this time aerosol packaging had been contracted to three widely separated contract packagers. Each was doing an excellent job but occasionally the same product from different contract packagers was not identical.

The real reason for deciding to do its own packaging, however, was to provide employment in an area where employment possibilities were diminishing due to the steady movement of industries from New England to other parts of the country, notably to the South. When this decision was reached in 1952, the plant engineering department went to work in earnest and by June, 1954, after two years of intensive effort, the equipment was purchased, set up, and put into operation.

When the line was first started the sales volume of Stanley's aerosol products would keep the line busy only 13 weeks out of a year. Sales have increased since that date, and new products, developed in the company's own aerosol research laboratory, have been added to the line, to the point where the line is now busy about 26 weeks out of a possible 52 weeks in a year, and sales volume continues to grow.

High Speed: Part Time?

The important matter to understand is that the line of aerosol products was profitable even with only 25% of its capacity being utilized. This is another example of the trend to profitable use of high-speed lines that are not operating all the time. This seeming paradox is possible only under specific conditions;

namely, that when a high-speed line is idle there can be a profitable use of the idled employees in some other activity.

Otherwise a high-speed line used to only a fraction of its capacity would be a waste. Since the "justification cost" of an employee is about $5,000 a year, it is easily seen that twelve employees idled at $5,000 a year each for three-quarters of the time would cost the company $45,000 during the idle time of the line. This could easily exceed all possible profit unless the $45,000 could be allocated to some other profitable activity.

Propellant Cost Factors

Fluorinated hydrocarbons, used as propellants for aerosol packages, are the most expensive ingredients in the class of items except foam products (shaving creams and the like). Hence, much thought was given to the handling of this high-cost ingredient in order to minimize the expense. Many companies purchase the liquefied propellant gas in 2000-lb. tanks. These are heavy, cumbersome (see Fig. 1), and require mechanical power-driven equipment to unload them from cars, store, take out of storage and place into use by connecting, piping, pumping out, disconnecting, lifting back into empty-tank storage, and finally loading back onto freight cars for return to the supplying company.

Still another item of propellant-cost has to be considered: It takes considerable effort to remove all the propellant from the 2000-lb. tank. The customer must provide equipment for removing the entire contents of the shipping vessel. According to Stanley's figuring, effort may be more than the residue is worth.

Hence, if the propellant in 2000-lb. tanks costs about $0.22 per lb., this figure must be increased by about 2% to cover the amount paid for, but not pumped out.

Tank Car Shipments

The economics of the situation where the propellant is received in bulk in tank cars is quite different, and is all in favor of tank-car purchases for large users like Stanley. First of all, the propellant in a 6000-gallon tank car costs about $0.223 per

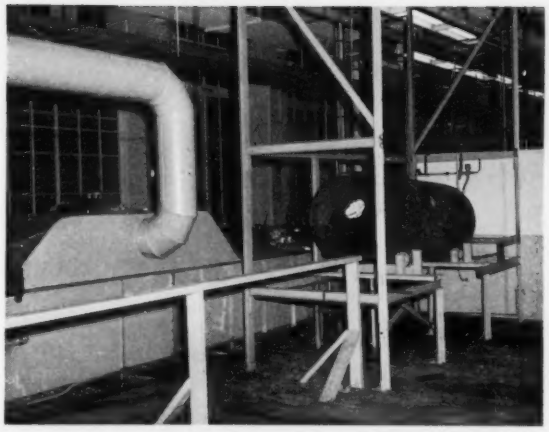


Fig. 1. Right: A 2,000-lb. tank of propellant used for pressure loading. Left: Ventilating hood to draw off any spray arising from tests on the line by quality control. (View from back side of line.)

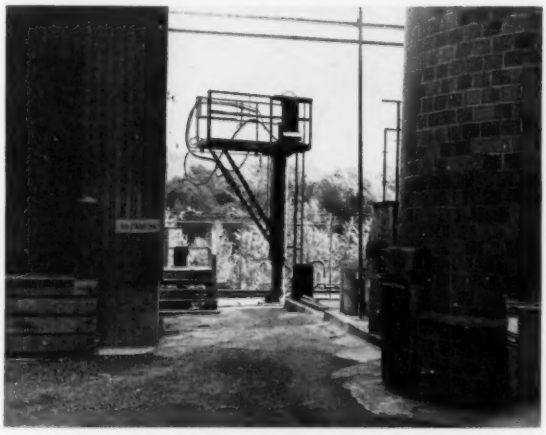


Fig. 2. This Nichols tower extends out over a tank car when it is on the siding, and permits a worker on it to make hose connections to tank car in perfect safety even when car is covered with ice.

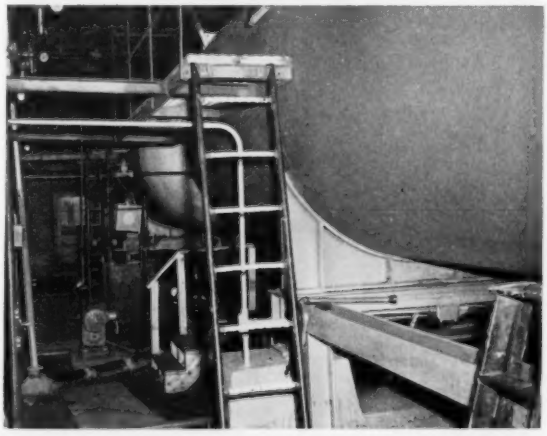


Fig. 3. Two 15,000-gallon bulk storage tanks of propellant. Inner ends are mounted on strain gauges to indicate weight of tank by remote control. Outer ends (not visible) are mounted on solid concrete piers. All piping made up with welded joints.

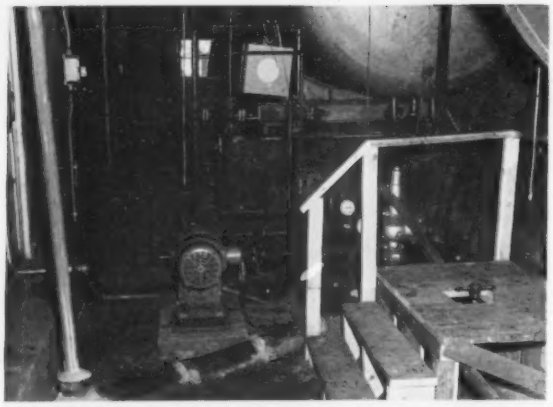


Fig. 4. Jerguson gauge, barely visible on end of tank, indicates liquid level and checks on the weight indicated by strain gauges. Top of a Henry valve shown in hole in platform. Variable speed, two-stage, motor-drive turbine pump for forcing propellant from tanks to heat exchanger.

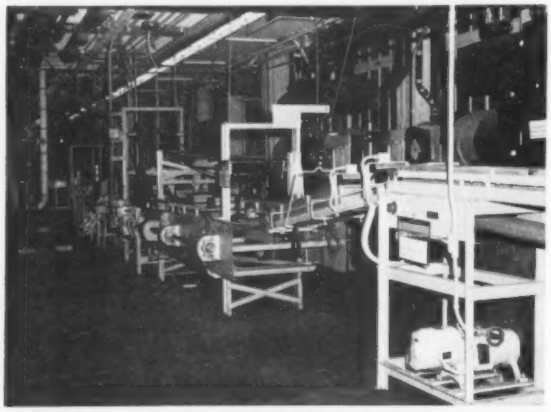


Fig. 5. Cases of empty cans come by conveyor from fifth floor to the uncaser. (View from back side of line.)

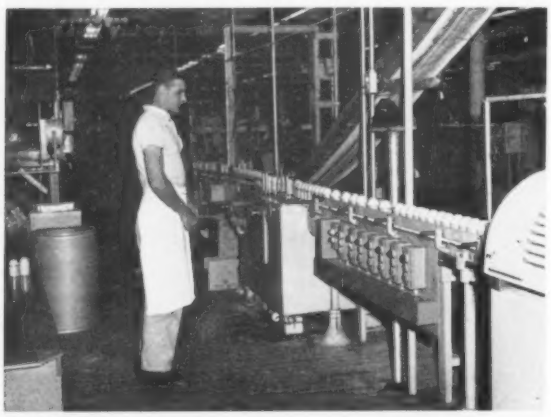


Fig. 6. Control panel located between the automatic code marker and air cleaner. Microphone in front of operator connects to loud speaker on fifth floor to convey verbal instructions regarding rate of feeding cases of cans. Empty cases from the uncaser ascend inclined conveyor for transportation to casing machine at far end of line. Note, in this and other illustrations, the overhead ½" rope extending from end to end of the line. In case of accident, one pull on the rope and the entire line stops.

lb. compared to about $0.233 in 2000-lb. tanks. Next, and fairly important, is the fact that any residue or "heel" left in a tank car is large enough to be easily measured with a high degree of accuracy and can be credited to the customer. Such credit, however, is possible only when certain mixtures of propellant are used. If it happens to be a mixture of Freon-12 and Freon-114, no credit is allowed.

Next in importance is the reduced cost of material handling in bulk as compared to handling in 2000-lb. tanks at the user's plant. Since an aerosol line operating at, say, 100 units a minute will use about 30,600 lbs. of propellant a day, this would involve the labor and equipment for moving, pumping out, etc., at least 18 tanks, each weighing about 2000 lbs., to say nothing of the very considerable area of storage space to store several days' supply of filled and empty tanks.

A tank car can be unloaded by pumping into large storage tanks and the time of only one man is required for doing it. Such equipment as he may need is a device, made by The Nichols Engineering Company (see Fig. 2), on which he can work with complete safety even in winter, rather than be required to clamber on top of a tank car that may be covered by snow and ice.

Plan Bulk Storage

Still another factor in favor of the use of tank-car shipments was the fact that the chemical plant producing the propellant was so located in New Jersey that about two days en route to the plant at Easthampton, Massachusetts, would be normal shipping time. Thus, it was calculated that a bulk-storage plant at Stanley's should have 30,000-gallon capacity in two 15,000-gallon tanks. Each would hold two tank carloads, totaling 12,000 gallons, thus leaving about 3,000 gallons of head space to allow for expansion and contraction without causing dangerous pressures.

And finally there is the little matter of freight cost. On 2000-lb. tanks the user pays the freight, whereas on tank-car shipments the supplier pays the freight.

When top management gave its

approval to the project, the two tanks were ordered from a boiler maker with side plate 1⅛" and ends 1⅜" thick, of all-welded construction. These were set in an outdoor location adjacent to the building which was to house the aerosol line. The tanks were then housed in Quonset Hut construction.

Use Of Gauges

In order to keep account of the quantity of propellant in each tank, one end was set on a Baldwin-Lima strain gauge (see Fig. 3) with an electrically connected remote recording instrument. The other end of each tank was set on a solid concrete foundation. Thus, each of the two strain gauges registered one-half the weight of the tanks and contents — a figure that required doubling to get the total weight. This, in turn, has been calibrated to read directly in units of thousands of pounds.

For a further check on the quantity of propellant in storage, a gauge glass, known as a Jerguson gauge, is used. (See Fig. 4)

Pressure-relief valves set at 125 psig are located in every place where it is possible for a pipe line filled with the liquefied gas to be shut off by valves. This is another safety measure to prevent explosions in case of fires. Atop of each tank are six 2", mercury-sealed, pressure-relief valves set at 150 psig, placed there for a similar reason.

In the housing over the two bulk-storage tanks, no special thermal insulation has been necessary. Summer temperatures do not increase internal pressure unduly and winter temperatures, of course, are no problem.

All piping for propellant is welded steel with Henry valves equipped with Teflon tetrafluoroethylene resin gaskets and valve seats. Piping arrangements are such that propellant from either or both tanks may be used.

Propellant Handling

Compressed liquefied propellant is pumped by two-stage motor-driven turbine pumps through a variable speed reducer, shown in Fig. 4.

In order to be absolutely certain that the liquefied propellant is water-free, it is passed through a bed of

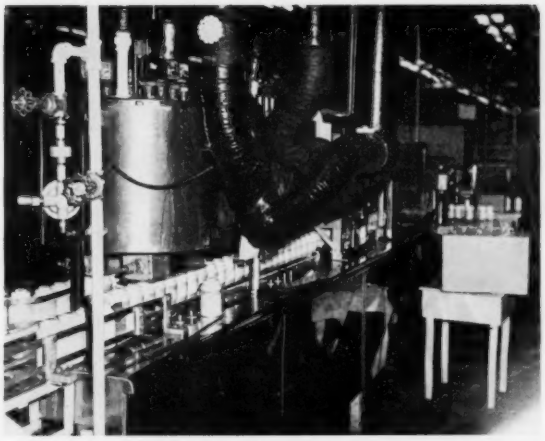


Fig. 7. Refrigerated filling requires heavily insulated pipes. View from back of line. Cans move from right to left.

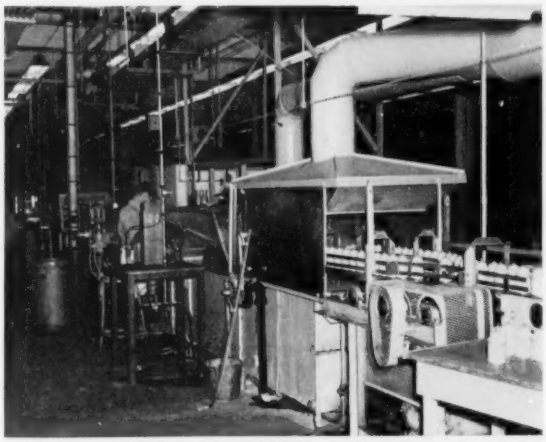


Fig. 8. Can movement here is from left to right. Worker dimly visible is inspecting cans in hot water bath for leaks. Beside his station are two puncturing devices to salvage contents of leakers. The hood encloses the station where air jets blow water out of valve recesses.

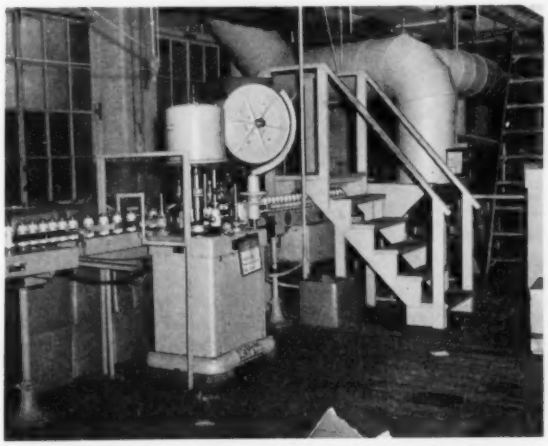


Fig. 9. Capper, followed by open space on line, left there for possible manual operations or for one more machine. Cans move from right to left. Back side of line.

Fig. 10. Automatic casing machine operator is barely visible behind drum of adhesive. Note the Graco pump in end-bung of drum for replenishing glue reservoir on case sealer. Saves dipping. Employees rotate jobs every 30 minutes.

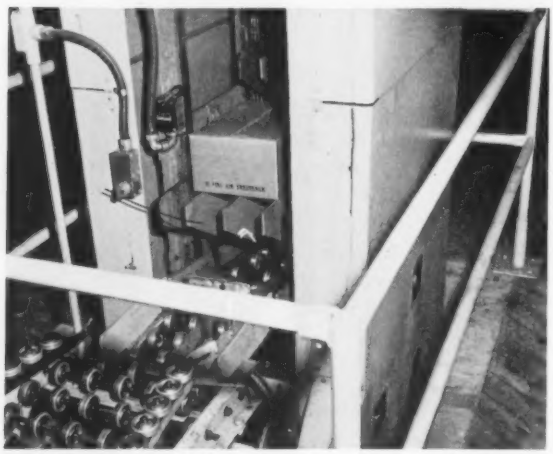


Fig. 11. Note safety device on Counsel case elevator. Any protruding case or one that tumbles off will strike the wire attached to microswitch and stop the line as well as flash a signal.

Fig. 12. More ingenuity: Langley lift has been modified and permanently installed so that operator can easily control height when loading pallets from conveyor leading from aerosol line.

activated alumina by which any traces of moisture are removed. However, propellant is almost refrigeration grade material and further dehydration is extremely difficult. Freedom from water is, of course, imperative where refrigerated filling is employed, for at the –30 degrees F temperatures of filling, any water would be frozen and cause stoppages if not actual damage to filling equipment.

Chilling the fluorinated hydrocarbon propellant to a temperature below its boiling point is necessary. The propellant used here for most of the products is a 50-50 mixture of Freon 11 and Freon 12, the boiling point of which is 4 degrees F. Freon 12, however, boils at –22 degrees F, and the solution must be cooled to below that point or Freon 12 will flash off when the solution is exposed to atmospheric pressure. According to experience in this plant, chilling to –30 degrees F is considered adequate. Warmer than this would be inadequate and colder would be a waste of power.

Use Of Refrigeration

Despite the fact that fluorinated hydrocarbons are considered good refrigerants, the company chose an ammonia refrigeration system. Duplicate, belt-driven 26-ton compressors are used, and installed with the necessary piping and cross-over connections that permit either one or both to be used. Each compressor is of a capacity large enough to carry about 60% of the chilling load, which is considered adequate insurance against a complete shutdown if one or the other compressors should break down.

The system of providing the filler with refrigerated propellant is deserving of attention for, with only 8 degrees difference between boiling temperature and the filling temperature, any line stoppage could easily result in a considerable warm-up of propellant. Should this occur the liquefied gas would easily boil over as soon as it touched the can. Thus, the cans would be decidedly short of propellant.

To avoid such an occurrence the

"I HAVE A PROBLEM . . . WHAT CAN YOU DO?"

For a year now Crossett ads have enthused about the flexibility of the cylinder machine production of our new bleach board mill—and how we can combine hard and soft wood pulps. We've talked about the advantages of buying from an independent mill that can assure steady supply in all markets.

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can stock	.011 up. Full bleached, bleach lined with semi-bleach back, and solid semi bleached.
plate and tray stock	.013 up. Full bleached, bleach lined with semi-bleach back, and solid semi bleach.
nested container stock	.013 up. Full bleached and solid semi-bleach.
cup stock	.009 up. Full bleached and solid semi-bleached.
lid stock	.013—.040. Full bleached, bleach lined with semi-bleach back, and solid semi bleach.
merchants tag stock	125# up. Full bleached and solid semi-bleach.
coating tag and file folder	125# up. Full bleached and solid semi-bleach.

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piping to the filler is arranged so that a constant flow of propellant at –30 degrees F is maintained through the filler reservoir, from which a constant stream is piped away to the suction side of the pump that forces the propellant through the refrigeration system. This system is important in eliminating warm-up mishaps that might easily follow any short line stop.

Filling Line Features

Filling at Stanley's is the familiar refrigerated filling, but several ingenious modifications have been made that are, to my way of thinking, the basis of the efficiency of the aerosol line. In planning the line, every effort has been made to use standard, readily obtainable equipment, but in using the equipment some heavy thinking and planning has resulted in the following features that are of special interest:

(a) In usual refrigerated filling operations the product is filled into the container before filling with propellant, but at Stanley's the propellant is filled first and followed by the product. The reason for this procedure is that enough evaporation of the propellant will occur to remove most of the air from the container before the valve is crimped on.

(b) Another unusual feature is the presence of an Exact Weight Scale Company Selectrol automatic check weigher which ejects any underweight cans.

(c) Still another refinement is found in the hot-water testing unit where leaks are detected. Many products that may leak into the water will produce so much foam that it becomes difficult for the inspector to observe any tell-tale bubbles arising from the flow of cans through the tank, e.g., shaving cream. A small perforated metal box, containing sodium tripolyphosphate, welded in place near the feed end of the tank, is adequate to prevent foam formations.

(d) A Graco Products Company air-operated pump is connected to the glue reservoirs on the corrugated case sealer. A drum of 55 gallons of the adhesive, sitting alongside the sealer, is thus supplied to the reservoir without the mess of dipping the adhesive. (See Fig. 10)

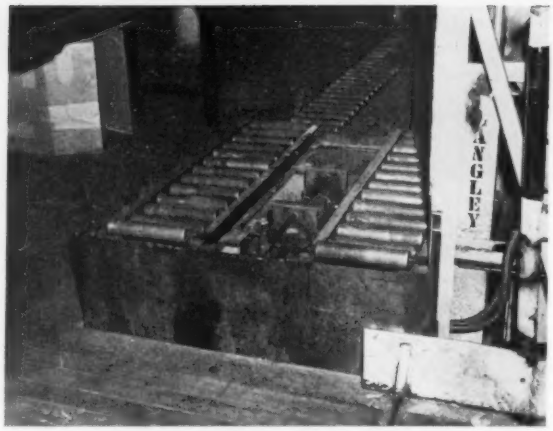


Fig. 13. Showing the mechanism of another ingenious work-saving device. After pallets are loaded, the platform is lowered flush with the gravity conveyor on which they roll away. Then the air-actuated cylinder between the two sets of rollers pushes the pallet off and it starts on its way by gravity.

(e) A testing station is provided at one point where a girl from quality control tests the sprayability and quality of the finished package. (See Fig. 9) She also records the usual observations regarding quality of containers.

(f) Sealed cases are lifted by a Counsel case elevator to a conveyor near the ceiling for transfer to the pallet loading station. While this is a standard piece of equipment, the engineers at Stanley have added a safety feature that will stop the machine and sound a signal to prevent serious damage to equipment. The gadget is merely a stiff wire connected to a micro-switch. If the case enters the elevator properly it will clear the wire, but if it projects beyond its proper position, or even tumbles off, it will strike the wire and stop the operation, thereby preventing any serious jams. (See Fig. 11)

So much for special features. Now to consider the equipment, its sequence of operations, and the labor involved.

Operation Of Line

The aerosol line at Stanley Home Products is more than 264′ long and is one of the longest lines of any sort that I have ever seen. Furthermore, it is a straight line without any turns. The reason for this is that it conforms to the normal flow of materials through the plant.

One man in the fifth floor storage keeps a conveyor supplied with aerosol cans in reshipping corrugated boxes. This conveyor delivers them to the horizontal conveyor on the first floor which, in turn, delivers the cases and empty cans to an A-B-C case unloader and shaker. The latter automatically empties the reshipper cases of cans. (See Fig. 5)

Following uncasing, the empty boxes go by an overhead conveyor to the caser at the far end of the line. Cans, however, next pass through an American Marking machine to receive a code mark on their concave bottoms, which is a rather tricky job.

Continuing on their path, the cans pass a control panel (See Fig. 6), and thence to a Pneumatic Scale Corporation air cleaner to blow any dust out of the cans. One man supervises all that goes on from the case unloader through the air cleaner.

Line Divides Into Files

After the air cleaner, the line divides into two files of cans going through the Alpha fillers (shown in Fig. 7) where a charge of propellant precedes a charge of the active ingredients. At this point four persons (sometimes only three) insert the valves into the passing cans. The next station is a pair of crimpers, operating in tandem on the two files of filled cans, to fasten the valves in

place. (Just beyond the crimpers is a pressure filling head, little used up to now, but available if pressure-filling is needed.) From here on, the twin files rejoin and the single file of cans continues to the subsequent operations.

The next step after crimping is a check weighing station where the filling machine operator tests an occasional can for the amount of fill and adjusts the filler accordingly. And following this station, the cans pass over the Selectrol check weigher where any light-weight cans are thrown out. One man tends the filler, crimper, check weigher (Selectrol).

Hot Water Bath

At this point the filled and crimped cans now enter the hot-water bath for testing for leaks. I.C.C. Regulations specify that all aerosol cans must be tested for leaks at 130 degrees F. In contrast to most water baths which operate at 150 degrees –160 degrees F, the cans here are submerged in hot water at 172 degrees F. The choice of this temperature was made to bring the can temperatures up to 130 degrees F in a shorter tank than would be required of the water bath were at 130 degrees F. This has permitted the use of a less expensive bath by virtue of its decreased length, and also keeps the several units on the line closer together, thus facilitating supervision by fewer line-workers.

The testing equipment, known as a Great Lakes water bath, carries the two files of cans down into the water on a metal flight chain. On the lower side of each flight is fixed an Alnico permanent magnet which effectively holds the cans in place on both down-hill and up-hill travel as well as horizontal submerged travel.

Picking Out Leakers

Another line worker, stationed near the exit end of the water bath, watches for tell-tale bubbles that reveal any leaky crimps, valves, or cans. He fishes the occasional leaker from the water by a long-handled clamp of a type similar to that used in grocery stores for picking packages from overhead shelves, said to have been invented by Benjamin Franklin.

Occasionally cans have been known to explode as soon as they enter the hot water, which has necessitated adequate safety shields. Leaks have been found occasionally along the bottom seam of the can body, but these are rare.

Salvage of contents of leaky cans is carried out where possible by the same worker. He inserts them in a puncturing device shown in Fig. 8. This quick-acting device, actuated by a foot pedal, clamps the inverted can onto a gasketed orifice and puncturing needle. The contents then flow under their own pressure (at 130 degrees F the pressure is rather high) into a pipe leading back to the reservoir on the filler.

Since most space-aerosol contents are about 85% propellant and 15% active ingredients (many aerosol products contain more concentrate and less propellant) and the ratio of quantity in a single can to the very much larger quantity of propellant in the circulating propellant system is so small, there is no chance of causing any noticeable change in the formulation of the charge for succeeding cans. Thus, both the propellant and the active ingredients are salvaged with the only loss being that of the can and the valve.

Use Of Personnel

Up to this point we have accounted for eight workers on the line: One man sending cans from the stock room, three machine tenders, and four men inserting valves.

As the cans emerge from the hot water bath they are washed clean with fresh hot water, then pass a station where a jet of compressed air blows all the water out of the recesses of the valve. (See Fig. 8)

Next comes a station where an exhaust duct carries away any residue from the periodic spray-testing of the finished packages. (See Fig 1) This is done by a girl "line analyzer" from the quality control laboratory. She, however, is not considered as line personnel.

Caps are next placed on the cans by a Consolidated Packaging Machinery Company capper. (See Fig. 9) Supplying the capper with caps, and supervising not only its operation but all the other automatic operations to the end of the line, except the case packer, requires the time of one more man.

An open space comes next on the line, left there for any possible hand operations or a possible location for an additional machine. (See Fig. 9)

Next comes the Standard-Knapp automatic caser which requires all of one man's time. At a line speed of 110 a minute and 12 cans to a case, he has to handle each case in 6½ seconds. (See Fig. 10)

From the case sealer the filled cases travel by gravity to the Counsel elevator equipped with a safety feature already described, (see Fig. 11) and are ultimately delivered by conveyor to the man who stacks them on pallets. (See Fig. 12)

In order to relieve the monotony of high-speed repetitive work, a scheme is utilized of 30-minute rotation on all jobs except that of the filler operator. In addition to the rotation scheme, the company has 10-minute rest periods in mid-morning and mid-afternoon.

The following tabulation shows the assignment of jobs on this aerosol line:

Taking empty cans in cases from stock room on 5th floor and placing on conveyor ..... 1 man

Supervising: uncasing, code marking and air cleaning ..... 1 man

Supervising: filling, crimping, check-weighing, and salvaging underfills ..... 1 man

Inserting valves ..... 4 men

Supervising hot water bath, water spray and air drying and salvaging leakers ..... 1 man

Supervising capper ..... 1 man

Case sealing .....1 man

Palletizing sealed cases ... 1 man

Unloading tank cars of propellant and operating refrigeration equipment ..... 1 man

Total: 12 men

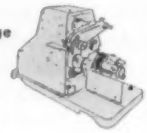
This aerosol line is about the most efficient line operation I have ever seen, and the results amply justify the sizeable engineering cost that went into its planning.

MARKEM

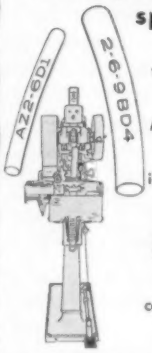
solved these marking problems

merchandise display printing

To aid retailers, a hosiery manufacturer provided plastic flower pots carrying designs and a sales message printed on tape. Because this method proved costly, a change was made to printing the pots directly, with a Markem PLBR machine. First month's savings alone paid for machine!



identifying markers from spaghetti tubing



Spaghetti tubing for wiring identification was needed with wide range of imprints. Manufacturer compared Markem Method to previous use of identifying tags, chose a Markem 48AI machine to automatically feed, mark and cut tubing to length. Savings in seven months — after labor, material and machine cost — totalled $17,000.

imprinting nut and bolt boxes

A leading fastener manufacturer now imprints his boxes directly with up to six variables, plus two color codes. Markem 25A machines do the job quickly and economically . . . help standardize packages for rapid shelf identification . . . simplify inventory control.

The Markem Method has benefits for every industry . . . find out what it offers yours.
Markem Machine Co., Keene 35, New Hampshire

MARKEM ...TO MAKE YOUR MARK

Even a fairly simple automatic packaging operation requires engineering skill in making it operative. This article tells how Hart & Cooley Manufacturing Company switched from a manual to a mechanized packaging operation and how its engineers adapted the equipment to their particular needs.

How to change to machine packaging of screws

To bring about higher production as well as reduction of packaging costs, Hart & Cooley Manufacturing Company, Holland, Michigan, producer of registers and diffusers for warm air heating, recently installed a machine operation for individual packages of screws and keys. Further, by making a number of engineering and operational changes on the equipment itself, the company engineers have tailored the machinery to fit the special needs of such packaging.

The old way involved using three girls on a packaging table. They manually inserted the desired quantity of screws and other items into fabricated envelopes. As each girl filled an envelope, she would staple it shut and let it drop to a waiting bin or receptacle. The normal operating rate was 15 packages per girl — or 850 an hour.

Switch To Machine

The new method involves a Brown Formapak machine, requiring one girl attendant. On volume items it runs at speeds as high as 75 to 80 packages a minute. Screws packaged range from $\frac{3}{8}$" to $2\frac{1}{2}$" long. Also there is some packaging of items other than screws, such as operating keys. The number of screws per pouch varies, such as two to eight of one kind—or an assortment of different screws in the same pouch.

The normal job of the machine attendant is to keep it supplied with roll stock and to keep its hoppers

filled with screws or keys being packaged. The machine fills from either or both hoppers simultaneously.

Each hopper utilizes a Syntron vibrator. Screws ride around in more or less spiral fashion. They leave the hopper by means of a channel which holds them by their heads, and with their pointed, threaded ends dangling downward as they move to the filling station.

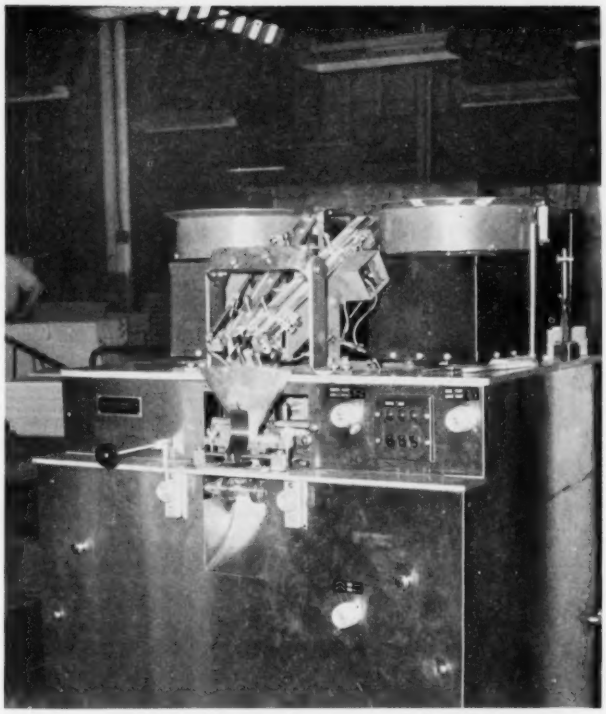
Meanwhile, the paper fed from roll stock moves into place. The free end of the web is folded over so that the fold serves as the bottom horizontal dimension of the package. Next, the two sides are heat sealed and the screws go into the package which thus is formed. After this, the horizontal top heat seal takes place and the completed package is cut free. Following this the free end of the paper is folded over about 180 degrees, as described above. Heat sealing temperature is 90 degrees centigrade.

Meeting Special Problems

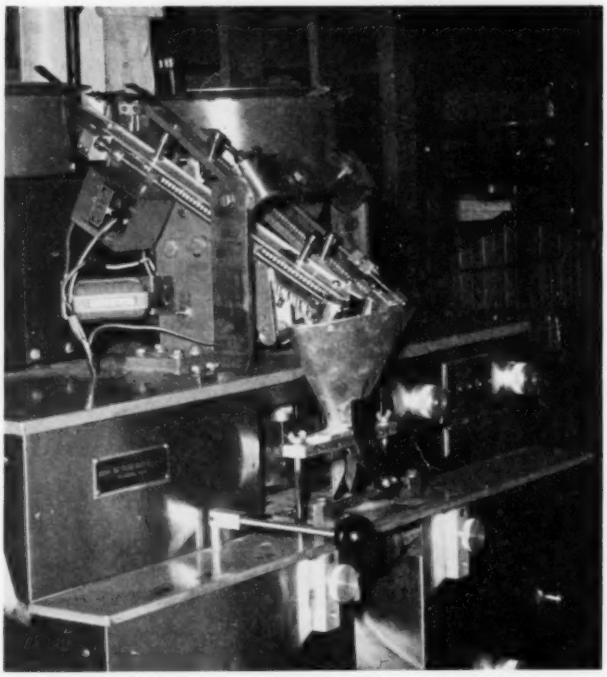
Because of the nature of the items being packaged, Hart and Cooley engineers worked out a number of features on the machine in order to meet these special needs. Because of screws getting tangled up and threads catching on threads, the engineers developed a new hopper and feeding mechanism. The result is a divided, rounded hopper into which screws feed successively. Also, they changed the vibratory hopper in order to handle a 2½" screw.

For these particular products they get a more accurate count by having the counter on the side instead of on top. By lining the hopper with strips of pressure sensitive tape they have reduced the noise. Without such lining, the screws and keys rattling around in the hopper created a considerable amount of noise.

Latest features of development include a magazine to feed keys to the point of package filling, and a printing attachment for the marking of packages. Probably the most difficult problem was developing a way to feed a key in time with screws being fed into the same pouch, the engineers explained.



Running at speeds as high as 75 to 80 packages a minute, this Brown equipment packages screws (and other items, such as operating keys) from ⅜" to 2½" long. Each hopper has a Syntron vibrator. Completed packages drop from chute to waiting bin — not visible in this photo.



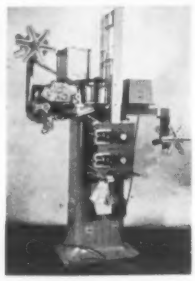
Prior to packaging, screws ride around in more or less spiral fashion. They leave the hopper by means of a channel which holds them by their heads. Note that their points dangle as they ride — before reaching the hopper from which they feed to the package.

Announcements of machinery and products

1. Beneath each announcement is a code number. As you select items on which you want more information, *note* this number.
2. Now, *circle* the corresponding numbers on the postcard, located inside back cover.
3. Next, *fill* in your name and address.
4. Then, *mail* the card — we pay the postage.

Liquid Unit Packager

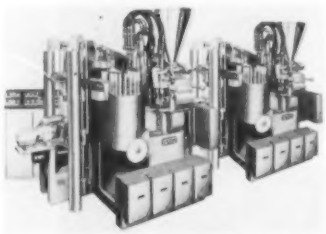
Wrap-Ade Machine Co., Inc. announces its Model UPL-2 unit packager for packaging liquids. The ma-



chine is equipped with two sets of sealing rollers, the first making side seals and the second end seals. Single row machines and up to four rows are available. Average speed of single row machines is from 40 to 60 packages per minute depending on product and packaging material. Typical materials used with this machine have a coating or laminate of polyethylene, vinyl or Pliofilm, for example, of at least .002". Circle No. 1.

Tube Filling Unit

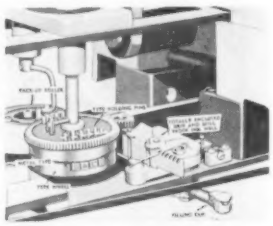
Arthur Colton Co. has a new Model 185 Quad Tandem automatic filling unit for toothpaste tubes which un-



loads, fills, registers, cleans, folds, crimps, and ejects 300 tubes a minute. The unit involves two filling machines, each of which fills four tubes at a time, in a tandem arrangement. Each filler can be run independently by adjusting carton conveyor index spacing, and has a 3-hp main drive, a 1/70-hp belt conveyor drive, a ⅛-hp flight conveyor drive and a ½-hp toothpaste gear pump motor drive. In the tube holders on each machine, 150 tubes per minute are automatically registered with an electric eye, air-jet and vacuum cleaned, preclosed and filled four at a time, double folded, crimped and ejected into a discharge chute. Circle No. 2.

Ink And Embossing Coder

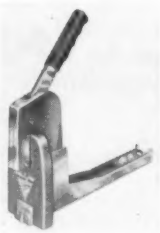
Doughboy Industries, Inc. announces a coder which uses metal type for both ink and embossing coding as an



integral part of its machines, to replace rubber coders used formerly. Doughboy says that the metal type permits changing one type character in a code combination without altering the clarity of the remainder. Dimensional stability is constant due to the use of metal type characters. Same type may be used for either ink or emboss coding polyethylene bags. Type is easily loaded in a wheel or roller and is held in exact position by spring loaded holding pins. Circle No. 3.

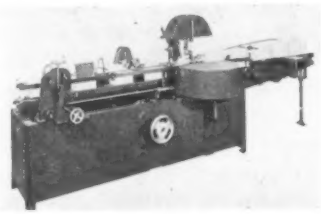
Carton-Closing Stapler Machine

International Staple and Machine Co. reports its new Clincher carton-closing stapler machine. The stapler features a one-hand operation. There is an adjustable penetration control for staple depth involving four screws, and a patented two-piece anvil designed for quick penetration. The staple pusher has no end projection and applies steady tension on staples until the last one has been fed. Circle No. 4.



Automatic Carton Closer

Peters Machinery Co. announces a machine that automatically closes up to 120 filled cartons per minute. The



machine carries open cartons from the carton-filling operation on a moving conveyor belt. A carton timer passes cartons into machine at a predetermined, uniform rate. The machine then folds and tucks the carton tops to close the cartons. Circle No. 5.

Adhesive Contact Label

Archer Label Co. reports development of an adhesive contact label, No. 131, which is easily affixed but difficult to remove. The label is speedily applied, sticks instantly to any smooth surface with strong gripping power, and after application adheres without additional pressure. It becomes virtually non-removable within one hour, says the company. No moistening nor heat is required to apply. Labels can be used to carry brand information,

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Packomatic

AUTOMATIC PACKAGING

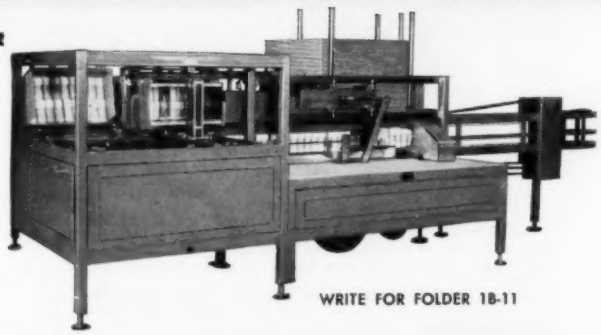
Whatever your shipping container requirements, there's a custom-engineered PACKOMATIC machine to reduce production costs and increase daily output.

For multiple loading of Simoniz liquid wax, a PACKOMATIC Automatic Case Opener and Loader — one of several PACKOMATIC machines used by Simoniz — sets up flat-corrugated cases for automatic loading. Another PACKOMATIC machine imprints lot numbers and shipping data on four sides before discharging carton to a PACKOMATIC Case Sealing machine. Fully-automatic, of course.

But regardless of your equipment budget or the degree of automation you require, there's a PACKOMATIC that can pay its way quickly in your plant. There's a machine to open cases, or load, or seal or imprint — or do any combination of these operations.

AUTOMATIC CASE OPENER AND LOADER

Depending upon the size unit to be loaded, proportion and packing arrangement of the cases, you can package 20 or more cases per minute on this machine, custom-engineered by PACKOMATIC to your needs. Multiple tier loading is used for packing such varied items as breakfast cereal, petroleum products, synthetic detergents. Phone collect, or write for literature about the advantages and economy of PACKOMATIC packaging.



WRITE FOR FOLDER 18-11

Other PACKOMATIC machines include the Bale Sealer — Case Sealers — Opener-Loaders — Case Imprinters — Telescoping Volumetric Filler — Packer-Gluers. Units available, semi-automatic or fully-automatic depending on your needs.

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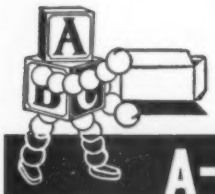
THE NEW A-B-C *Junior* CASE SEALER



The A-B-C Junior Case Sealer automatically seals corrugated shipping containers in only a fraction of the floor space ordinarily required. Operation is fast—trouble free—economical. A completely new flight chain construction virtually eliminates carton jamming . . . Three semi-automatic models are available to fit most case sizes. Write today for details and floor plans.

A-B-C PACKAGING MACHINE CORP.
TARPON SPRINGS, FLORIDA

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SLIPICONE

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Available in Compound or Spray—for quick, efficient application to all types of packaging and labeling equipment. *Compound*—2 and 8 oz. tubes; 10 lb. cans. *Spray*—12 oz. aerosol bombs.

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instructions, diagrams or other information of a permanent nature. Circle No. 6.

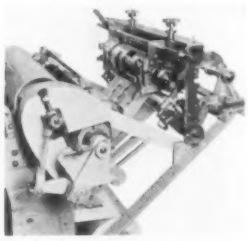
Triple-Wall Corrugated Board

Tri-Wall Containers, Inc. announces development of Tri-Wall Pak, a triple-wall corrugated board designed

as a heavy-duty packaging medium, recently granted a U.S. patent. This board is manufactured in a single pass through a combining machine. It has strength which extends the usefulness of corrugated into packaging applications not before possible with single or double-wall corrugated board, Tri-Wall says, and fills the gap between corrugated and wood as a packaging medium. Boards are available in two strength ratings, averaging 900 and 1100 G.E. puncture test and have ability to withstand compressive loads of 700 and 1000 lbs. per lineal foot respectively. Circle No. 7.

Imprinting Attachment

Adolph Gottscho, Inc. reports a compact imprinting attachment for installation on any standard wrapping or



bundling machine. The attachment is designed for imprinting any changeable legend on the wrapper as an integral part of the packaging operation, on wraps of cellophane, other films, and paper. It has a flexographic printing system that uses fast-drying liquid inks of any color. The unit can be synchronized with the parent machine at any standard production speed and is available in sizes to produce imprints up to 24" wide. Circle No. 8.

Continuous Polyethylene Film Seal

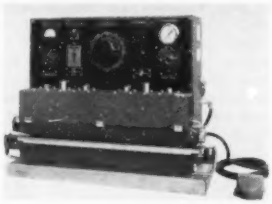
Bakelite Co., Div. Union Carbide & Carbon Corp., has developed a continuous seal for polyethylene film pro-

duced at rates of 500′ per minute or higher, made possible by a new

molten bead sealing principle. The new principle extrudes a hot filament of polyethylene between two layers of film at the point where they are to be sealed, rather than attempting to drive the heat through the films. The technique may be used to seal polyethylene film of almost any thickness, and is applicable to the sealing of polyethylene coated paper, laminates, and paper. At this time, however, no equipment is commercially available for this technique. Bakelite invites inquiries regarding this development. Circle No. 9.

Heat Sealing Unit

Package Industries Ltd., Inc. announces its Sentinel controlled impulse sealer which heat seals thermo-



plastic films, such as polyethylene, Mylar, saran, etc. A calibrated transformer controls temperature and indicates it on a volt-meter. An electrical timer, which is divided into tenths of a second, controls dwell-time of the heating impulse. A second electrical timer controls the over-all dwell-time for both heating and cooling. Sealing jaw pressure is maintained throughout both the heating and cooling cycles. Circle No. 10.

Metal Detector

J. W. Dice Co. reports its Model TM metal detector which automatically signals the presence of unwanted

tramp metal particles hidden in nonmetallic materials, either packaged or in bulk. Typical products which can be inspected automatically, at conveyor speeds up to 1000 fpm, are foods, plastics, lumber, textiles, rubber, confections, and pharmaceuticals. The detector is sensitive to ferrous and non-ferrous particles. Contaminated material passing through the test coil causes a reject relay, which may be used to sound a warning gong or trigger a marking device, to operate in the electronic unit. Circle No. 11.

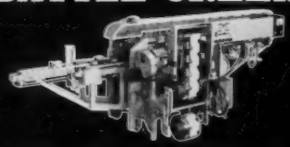
Crown Varnish

Armstrong Cork Co.'s Glass and Closure Div. announces its new AR-

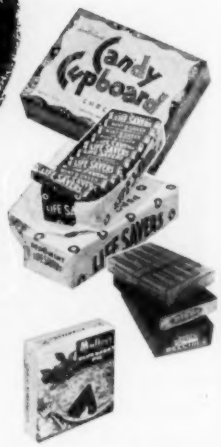
If it's a question of

flavor sealing

BATTLE CREEK



has the answer



Illustrated is a Battle Creek Model 51, precision engineered to handle packages at speeds up to 180 per minute.

Much of the effort of selecting the proper protective papers and attractive design of the package can be wasted through improper packaging. At Battle Creek, we have spent 44 years working on protective packaging, giving careful attention to every detail. This meticulous detailing, design and precision engineering all combine to give you flavor sealed packages at lower cost.

LET US WRAP YOUR PRODUCT. Send us samples of your products (or if they are perishable, describe the packages and sizes) and tell us the kind of overwrapping you require. We will either wrap and return them promptly with our recommendations, or give you our best suggestions in answer to your inquiry. If you have specific questions, we would welcome a letter from you.

"Continuous Flow" Packaging"

BATTLE CREEK
packaging machines, inc.

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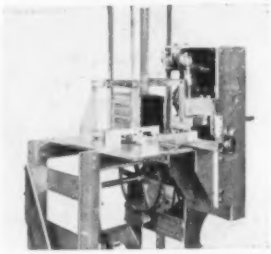
190 crown varnish. This is a tough protective coating for crown decorations, which flows smoothly over surfaces to give decorations added qualities of durability. It also insures color retention in decorations, particularly the retention of light colors. Circle No. 12.

Carton Printing Attachment

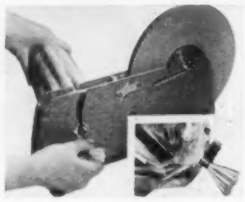
Industrial Marking Equipment Co. has a new carton printing unit for attachment to carton sealing machines



for marking, dating, and coding. The unit is designed and built to automatically feed cartons from an adjustable magazine through the imprinting stage and into the sealer. Imprinting is dry before carton ends are glued. Production rates up to 60 cartons per minute are possible. The machine includes a removable printing head. Imprint is made with identification marks on carton end flaps using 10-, 12-, 14-, or 18-point type; printing area covered is up to 2" by 5". Boxes currently handled vary in size. Circle No. 13.

Bag Sealer

Better Packages, Inc. announces its Nike bag sealer, designed for sealing polyethylene bags with pressure-sensi-



tive produce packaging tape. A one-motion machine, sealing is accomplished with a single downward motion. Tape is automatically cut off at the end of the downward stroke. The Nike will handle regular 60-yd. rolls or large triple-size rolls in widths from ¼" to ½". Peripheral tape roll guide, adjustable to the exact width of the tape being used, centers tape in the machine. Circle No. 14.

Flexographic Press

Champlain Co. reports a new flexographic press for color printing at high speeds. The press features unit assembly that can provide up to three color stations mounted vertically in a single stack. It was designed for printing on board, but is suitable also for

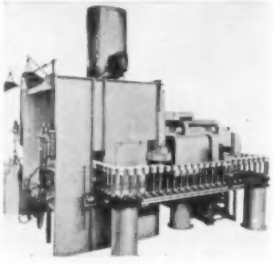
such materials as plastics, cellophane, foil, glassine, paper, and paperboard. It can be used in line with special fabrication equipment to provide printing, punching, scoring, and stripping in a single operation. It can also be used in combination with a sheeter-rewind or specialty unit. There can be a second unit stack if desired. Each stack has its own drying system. Circle No. 15.

Polyethylene Drum

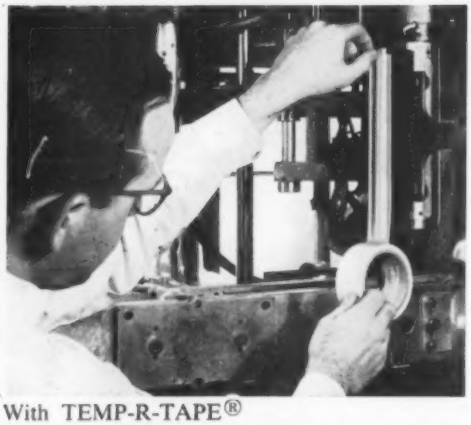
Plax Corp. has a new 13-gal. polyethylene drum, barrel-like in appearance and construction, which incorporates such features as two folding handles, pouring spout, separate opening for filling and venting, hand-grip on the bottom, and strengthening ridges that permit the drum to be rolled on its side. Colored folding handles, and filling and pouring necks are located in a recessed area on the top of the drum. Top and bottom contours are convex to permit the containers to nest one on top of the other. Circle No. 16.

Spray Coating Machine

Paper Machinery Corp. announces its Series C-400 automatic spray coating machine for high-speed plastic coat-



ing of paper drinking cups and food containers. These containers can be automatically coated on the inside and brim with low cost plastic formulations with this machine. It can be adapted to other uses where automatic spray coating, baking, or curing is needed. It has a four-temperature controlled dryer-oven, either electric or gas fired, with positive temperature control of each section. Circle No. 17.



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***Many different* uses for Temp-R-Tape in packaging.**

ON HEAT SEALING BARS
ends sticking and spoilage, replaces in seconds, cuts down time.

ON FORMING PLATES
reduces static electricity and wear.

ON FORMING DIES AND BARS
cuts lint and glue build-up.

ON GUIDE RAILS
ends scratching, quiets operation.

MANY OTHER USES
send for folder and sample.

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407 East Street, New Haven 9, Conn.

Rubber Roll Covering

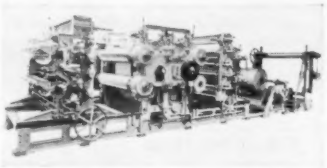
Stowe-Woodward, Inc. has developed a silicone rubber roll covering, Rol-ease, which makes it possible to extrude film for laminating so that it extends over the edges of the paper. The film will not adhere to the Rol-ease and will not lap. It can be slit off and reused. The roll is naturally heat resistant and can withstand approximately 100 lbs. of pressure. Circle No. 18.

Spiral Nail For Box Making

Jones & Laughlin Steel Corp. announces its Ardox spiral nail. This nail, says J & L, has increased holding power, is easier to drive, reduces wood splitting, and is more economical. It gives box makers and other users the advantages previously confined to a threaded nail. J & L says part of its extra holding power is due to its merely pushing aside rather than cutting the wood fibres. Later these fibres resettle into the grooves of the spiral. Circle No. 19.

Oil-Ink Press

Potdevin Machine Co. reports its new two- and four-color oil-ink press for printing on all types of multiwall



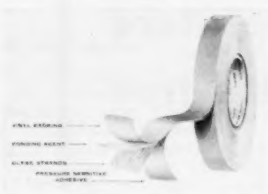
bags. The press is designed to make it capable of retaining high quality printing even when operating at speeds of 600′ to 800′ per minute. An individual impression cylinder for each color is available. Other features include ink carriage rack-back, hydraulic impression lock, lateral and circumferential running register control, 13-roll distribution system per color, and canvas back or adhesive back rubber plates. Circle No. 20.

Adhesives For Laminating

National Adhesives Div., National Starch Products, Inc., has three new adhesives for laminating work. One is formulated to laminate cellulose acetate butyrate to foil in the production of metallic yarn and has a viscosity of 2500 cps. The second is used to make "boilable" flexible containers by laminating reverse printing cellulose acetate to foil, and has a viscosity of 500 cps. The third is for laminating Mylar to metallized Mylar or Mylar to foil with a viscosity range of 2000 cps. All three may be applied by reserve roll or gravure application. For best results, they should be applied to foil and the coating weight should range from 1.5 to 2.5 lbs. per ream. Circle No. 21.

Strapping Tape

Dutch Brand Div. of Johns-Manville announces its new 250 lb. tensile strength strapping tape with a vinyl plastic backing. This No. 400 tape, which has a holding power of 68 to 72 lbs. per square inch, is suited for packaging, package reinforcing, bundling, palletizing, unitizing, and tear stripping. The tape is flexible and conforms to irregular surfaces. J-M says it will not cut into edges of



packages. Available in standard widths from ¼″ to 60 yard rolls, the tape meets U.S. Federal Specification PPP-T-0097a Type II. Circle No. 22.

Filling Equipment

Oil Equipment Laboratories has a new Pres-O filling machine for fast filling without explosion hazard for use with propane, butane, and the like, and alcohol and other combustible materials commonly used in toiletries, cosmetics, and household products. Entire filling operation can be handled through container valves and the equipment is air-operated. Since there are no electric controls, says Oil Equipment, there is no possibility of residual gases becoming trapped in equipment to create a lingering hazard. Pneumatic start and stop controls are located for remote operation. Circle No. 23.

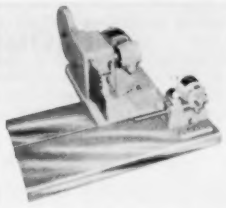
Tube Marking Machine

Markem Machine Co. announces its Model 20A cylindrical object marking machine, which can mark vacuum

tubes as fast as 7000 per hour. This machine handles tubes by means of five different interchangeable chutes and has calibrated adjustment scales. Molded rubber printing elements and specially formulated marking compounds for glass, metal, etc., assure clear imprints. Chute feed and automatic ejection provide production speeds from 3000 to 7000 tubes per hour. The machine has dimensions of 26″ by 13″ by 18″, has a bench mounting, ¼-hp motor drive, and maximum imprint size is 2-⅞″ by 6″. Circle No. 24.

Closure Machine

Tipper Tie, Inc. has a new unit for automatically applying aluminum closures (end ties) on casings containing meat and cheese products, such as filled plastic bags containing poultry, meat loaves, cold cuts, etc. An optional feature of the new unit is a "vacuumizer": It deflates the filled bags and removes the air around



the product, which makes for better preservation of the product and a better package, the company says. Circle No. 25.

Double Coated Tape

Minnesota Mining & Manufacturing Co. reports development of its "Scotch" brand double coated tape No. 665, utilizing adhesives that won't stick together but will hold securely to other material. No. 665 is a double coated tape without a protective liner. Properties of the adhesives enable the tape to be wound on a roll without sticking to itself. The tape, which is 3.5 mils in thickness, is available in 36-yard roll lengths and in standard widths from ¼″ to 1″ and other widths by special order. Circle No. 26.

"Our Packmaster does it 50 TIMES FASTER at 1\9 THE COST"

Reports one aircraft manufacturer

Save money — time — space — on small items packaging with the versatile, high-speed PACKMASTER. Packs, prints and counts packages automatically on one compact machine that quickly adjusts for all size packages. Packages may be transparent or opaque on either or both sides. Packages feed out in a die-cut ribbon which can be accordion folded for easy packing or quickly hand separated.

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PACKS automatically

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2. Now, *circle* the corresponding numbers on the postcard, located inside back cover.
3. Next, *fill* in your name and address.
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Mylar Film Adhesive

Industrial Finishes Div. of the Du Pont Co. offers an 8-page technical bulletin on adhesives for Mylar film. Representing a new class of adhesives, they have excellent clarity, color stability and low odor. Six grades are listed, as well as information on laminations, application, bonding, uses and safety precautions. Circle No. 101.

Aluminum Foil

Aluminum Co. of America has published a 48-page book describing aluminum foil. It outlines the physical, chemical and mechanical properties of foil, its quality characteristics, converting methods, applicable coatings and adhesives, and specific packaging uses. Circle No. 102.

Dry Labeling

New Jersey Machine Corp. compares advantages of heat-seal labeling of glass containers with glue labeling, in a 4-page brochure. Circle No. 103.

Bag Tying Machine

Plas-ties Co. bulletin lists advantages of the new "Plas-tie-matic" bag closing machine. It automatically ties vinyl covered wire tapes to plastic film bags at about 60/min. Circle No. 104.

Plastic Food Jars

Continental Can Co. data sheet describes the "Sturdy Pak Container" for food spreads, relishes, etc. Molded of high impact polystyrene, they can be filled and capped automatically or by hand. Available in 8-, 12-, and 16-oz. sizes, these packages use either polyethylene or polystyrene lids. They are shaped to nest in storage and are supplied in colors. Circle No. 105.

Band Type Heat Sealer

Ralph Chaffee & Co. offers a bulletin, "Production Line Heat Sealing." It describes its metal band type Rotor-Sealer which is adapted to heat sealing moisture-proof films at speeds up to 315" per min. Circle No. 106.

Label Paster

Potdevin Machine Co. has a data sheet picturing its label paster and coating machine with a semi-automatic friction demand feed. Available in 6", 9", or 12" widths, it handles ungummed labels of 2" minimum length. The touch of a lever delivers a coated label ready for application. Circle No. 107.

Gravity Fillers for Petroleum Products

Horix Mfg. Co. offers a line of petroleum products gravity fillers in an illustrated brochure. Machines fill motor oil, brake and cleaning fluids, antifreeze, etc., in "F" type, sanitary, and cone top cans. Low or high speed units are available. Circle No. 108.

Plastic Tube Filler and Sealer

A & M Tool & Die Co., Inc. has a bulletin describing two models of a tube filler-sealer that handles plastic tubes and closures. It can also be adapted to fill metal tubes, bottles, and jars. Capacities are adjustable from 2 cc. to 7 oz., with speeds from 20 to 80 tubes per min. A specification check list is included to help you outline your requirements. Circle No. 109.

Carton Set-Up Machine

E. L. Bivans, Inc. pictures its "Tuck-o-mat" carton set-up machine in a brochure. Practical for short or long runs, the machine has an output of 4,000 cartons per hour. It sets up reverse tuck cartons from ⅜" high by ⅞" wide by 1¼" long to 3½" high by 5" wide by 12" long. Circle No. 110.

Gentle Unscrambler

Island Equipment Corp. Bulletin WP-2 explains action of its unscrambling machine. The unit will not rub, bump or scratch containers. It handles round or unusual shaped bottles, jars and cans up to 3⅝" wide at high speeds. Circle No. 111.

Bucket Elevating Conveyors

Lynch-Robo Corp. offers an illustrated bulletin on the "Robo-Lift" bucket elevating conveyor. Used in loading filling machine hoppers, this machine smoothly transfers product in interlocking buckets. It moves horizontally, diagonally and/or vertically. Any number of pick-up and discharge stations can be provided. Circle No. 112.

Average Net Weight Calculator

Scale Specialties & Systems, Inc. offers Bulletin 511 describing its package weight calculator. The unit is adaptable to any checkweigh scale and visually records weight values on a strip chart. This instrument enables you to maintain an extremely close tolerance to average package weights. Circle No. 113.

Collapsible Tubes

Standard Collapsible Tube Co. has a 16-page booklet describing its line of collapsible metal tubes. It explains the metals, coatings and finishes used, and enumerates tube sizes, openings, caps and applicator pipes available. Tube packing and shipping methods are also listed. Circle No. 114.

Water Vapor Transmission Rates

Glassine and Greaseproof Mfrs. Association has a handy chart showing the water vapor permeability of 15 different flexible packaging materials that were tested by TAPPI Standard Methods. Circle No. 115.

Checkweigher

Bartelt Engineering Co. describes its automatic checkweigher in a 4-page brochure. Handling rectangular packages up to 4½" by 7¾" base size, and round containers up to 5⅛" dia., it provides increased weighing accuracy up to 130/min. It automatically by-passes overweights and underweights to two or three-way segregation lines. Circle No. 116.

Automatic Cartoner

Container Equipment Corp. describes its Model 40 cartoning machine in a current bulletin. It automatically moves cartons from flats in the hopper to the closing or sealing stations, allowing for hand insertion of the product. Producing sealed cartons up to 90/min., machine handles glue seal

cartons, straight tuck cartons, reverse tuck cartons or any combination of these. Carton sizes handled range from 1" long, ½" wide, 1⅝" deep, to 10" long, 5" wide, 30" deep. Circle No. 117.

Bag Maker — Filler — Sealer

Hudson-Sharp Machine Co. brochure describes its new "Campbell-pak" machine. It converts thermoplastic film roll stock to heat sealed bags for sequence packaging of powders, granulars, liquids and solids. Three models produce bags from 1" to 14" wide by 2" to 20" deep, at speeds up to 40/min. Circle No. 118.

Package Imprinters

American Marking Corp. bulletin provides specifications for three different models of marking machines. These units imprint code-dates, sizes, colors, etc. on cartons, cans, jars, bottles, cellophane bags, etc. Circle No. 119.

Specialty Films

Dobeckmun Co. folder explains the different combinations of films used in manufacturing "Durafilm," a custom-made transparent material designed for its toughness. Brochure includes prices and specifications for various grades of this material. Circle No. 120.

Pharmaceutical Bottle Sealer

Arenco Machine Co. has a folder describing its "Capsolut Universal," a hand operated metal cap sealing unit for bottles and vials carrying sterile solutions, tablets, pills, etc. It also seals aerosol bottles. The sealing device can be quickly changed to accommodate caps between 8 mm. and 45 mm. diameter. Possible with this machine are 800 to 1,500 seals per hour. Circle No. 121.

Hand Fed Wrapper

Miller Wrapping & Sealing Machine Co. has a data sheet describing its Model MP wrapper. The machine uses pre-cut cellophane sheets in wrapping irregular and rectangular shaped packages from 2½" to 15" long, 1" to 9" wide, ½" to 5" high. Unit produces up to 21 packages per min. with one operator. Circle No. 122.

Versatile Labeler

MRM Company, Inc. offers a bulletin listing its "Uni-Matic" automatic labeler. The machine handles thermoplastic, ungummed or gummed labels from postage stamp size to 6" by 6", in odd or rectangular shapes. Models are available for front, or front and back labeling of glass, metal, plastic or cardboard containers, Circle No. 123.

Heat Sealing Bag Machines

Simplex Packaging Machinery, Inc. Bulletin SPM-3 gives specifications for five models of its bag making machines. Using almost any heat sealing material, these units automatically produce folded bottom bags at speeds up to 4,000/hr. Bag sizes range from 1½" to 17" wide by 1½" to 28" long. Circle No. 124.

Mylar Brochure

The Du Pont Company Film Dept. offers brochure No. A-2456 illustrating 25 successful packaging applications using Mylar plastic film. The bulletin outlines the chief characteristics of this tough material, which is ideal for heavy duty, transparent packaging. Circle No. 125.

Semi-Automatic Wrappers

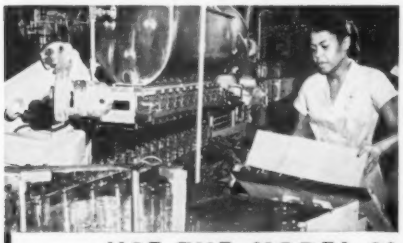
Schooler Mfg. Co. bulletin shows five models of its line of semi-automatic wrappers. Using cellophane, wax paper or foil, these low cost machines produce up to 1,200 packages per hour. They handle sizes ranging from 1½" to 12" long, 1" to 8" wide, ¾" to 4" high, making adjustments without change parts. Circle No. 126.

Liquid Packeter

Brown Bag Filling Machine Co., Inc. has published an information sheet describing its liquid packeter. The machine is designed to handle free flowing, viscous and semi-viscous liquids, at speeds ranging from 70 to 400 packets per min. It forms pouches, fills and seals them. Circle No. 127.

Rotary Heat Sealer

Doughboy Industries, Inc. lists information about its Series AT rotary



A complete Filler Machine Co. line at Brook-Maid Co., Inc., Brooklyn including unscrambler, cleaner and straight line filler filling jams, jellies and preserves.

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heat sealers in a current bulletin. These machines heat seal bags made of cellophane, glassine, wax paper, coated paper, foil and laminates. They are especially suitable for sealing materials conforming to military specifications. Circle No. 128.

Automatic Bag Filler-Sealer

Consolidated Packaging Machinery Corp. has a four page brochure on its "Sealtite Bag Sealer." Machine automatically packs sugar, coffee, flour, rice, etc., in a squared bag with a double fold, glue sealed closure. It feeds bags from a magazine. opens, fills, settles, shapes and seals them up to 50/min. Circle No. 129.

Moisture Absorbents

Culligan, Inc. has published a product information bulletin about "Humi-Sorb," a desiccant for protecting packaged perishable products against moisture. Such products include pharmaceuticals, cereal, crisp baked goods and confections. It tells how to select the correct amount of this material for a specific application and describes "Humi-Sorb's" chemical and physical properties. Circle No. 130.

Rotary Labeler

Standard-Knapp's Model 950 single automatic labeler is described in a current bulletin. The machine is designed for labeling and foiling usual sizes of round, hexagonal and octagonal bottles and jars up to quart size, at speeds up to 80/min. Label sizes range from 2″ to 5½″ wide. Circle No. 131.

Industrial Parts Packaging

Pak-Rapid, Inc. offers a data sheet on a new pouch making, loading and sealing machine for small parts. It automatically packages even or odd shaped items in single or multiple units, whether oily or dry, up to 1¼″ thick, in transparent films, barrier papers or foil laminations. This unit meets all requirements of MIL-P-116-B Method 1 packs, and MIL-STD-129 identification requirements, even to evacuating all trapped air required under Method 1A8. Circle No. 132.

Automatic Cartoners

R. A. Jones & Co., Inc. offers two models of its "CMV" automatic cartoning machines in a 4-page brochure. These units take a flat carton from a magazine, open it, tuck bottom flaps, convey open carton past manual loading stations, tuck top flaps and deliver the loaded carton. Cartons handled range from ½″ by ¾″ by 2½″ up to 4¼″ by 4¼″ by 9″. Circle No. 133.

Marking Equipment

Markem Machine Co. data sheet lists Model 70ABA in-line production marking machine for cartons, fibre containers and other flat or nearly flat surfaces. The machine is a printing unit for mounting on a conveyor line or it can be used in conjunction with packaging machinery. It is activated by air pressure and uses insertable type or rubber printing plates. Maximum imprint area: 2″ by 6″. Speed range: approximately 3,600 imprints per hour. Circle No. 134.

Net Weight Scales

Hayssen Mfg. Co. describes its automatic net weight scales in a 4 page bulletin. Featuring a Triple Vibrator feed for maximum accuracy, these machines are available in 2, 3, 4, 5 or 6 scale units. Circle No. 135.

Expendable Pallet

Titan Pallet Co. offers a brochure describing its new tray-type expendable pallet Model P, designed to hold up to one ton and stack loaded four-high. In addition to detailed illustrations, the brochure includes a tabulation of specific costs involved in a case history of a group of car-load shipments from New York to Atlanta, Georgia. Circle No. 136.

Heat Seal Papers

The Brown-Bridge Mills, Inc. has a sample book showing its complete line of heat seal papers. Appearing on each sample included is an enumeration of its properties and a description of its suggested use. Flexible packaging materials suitable for use with these papers are listed. Circle No. 137.

Lubrication Systems

Bijur Lubrication Corp. announces Bulletin 4A, illustrating and describing its distribution system for automatic metered lubrication. Line drawings and charts of engineering applications accompany the half-tones and illustrations showing the use of this equipment. Suggestions conducive to improved lubrication are set forth. Circle No. 138.

Bag Paper Selector

St. Regis Paper Co. offers a slide rule type paper selector for multiwall bags. Related data appearing in the different slots and columns includes properties of papers, a description of the various types of papers, and a representative list of products using particular plies. Circle No. 139.

Carton Filling Machinery

John R. Nalbach Engineering Co. has a bulletin describing its high speed rotary volumetric carton filling machine, whose speed is adjustable from 60 to 120 cartons a minute. This illustrated bulletin includes general specifications, details of operation, and suggested applications. Circle No. 140.

Baling Press

E. W. Loeser Co. offers a bulletin describing its Empire pit-baler incorporating its new fluid drive and coupling, designed to minimize shock and vibration. The bulletin, catalog sheet LO 856, reviews the features of this equipment and explains its operation. Circle No. 141.

Photoelectric Relays

Ess Instrument Co. has a booklet describing its miniaturized electric eyes, designed for packaging, counting, printing and general production operations. A series of line drawings accompanies the explanatory text and technical data concerning these electric eyes. The drawings show just how these small (1⅞″ by 2″ by 2¾″) units are installed. Circle No. 142.

Pressure Sensitive Labeling

Archer Label Co. offers Bulletin 756, a four-page folder enumerating details of its contact labels and dispensers. Half-tones illustrating the equipment accompany the detailed text, which describes the materials, applications, and use of these labels. Circle No. 143.

Simultaneous Filling, Labeling

The Biner-Ellison Machinery Co. has a 10-page brochure illustrating their Filabelmatic that fills still liquids in bottles ranging from 1 oz. to 1 gal. and at the same time accurately applies labels ranging from 1″ square to 5½″ by 6″. This machine requires only 4′ by 5′ of floor space. Also pictured and described are this company's automatic and semi-automatic labelers, fillers, single liner and air cleaner. Circle No. 144.

Portfolio Of Printed Cartons

Crossett Paper Mills has a portfolio of sample cartons printed on Crossett board. Cartons show how by combining outer layers of short fibre hard wood pulp with inner layers of long fibre pulp, a boxboard is produced that has maximum strength yet prints well on the super smooth white surface. Circle No. 145.

Film And Foil Sample Kit

The Amos Packaging Div. has a sample kit of special polyethylenes and coated foil. Samples include Amosheet for added transparency and high gloss, Amosteen special heat resistant film, Amothene, an extra strength, high clarity film, and Amofoil polyethylene coated foil. Circle No. 146.

Power, Lever Paper Cutters

The Challenge Machinery Co. offers Bulletin No. 633, an 8-page booklet describing its "H" series of power and lever paper cutters in the 19″ through 30″ sizes. Equipment details are illustrated, and specifications and features are listed. Circle No. 147.

Photoelectric Controls

Autotron, Inc. announces Catalog 57, a 16-page illustrated booklet describing its photoelectric controls and light sources — ranging from moderate to ultrasensitivity, high-speed and impulse actuated units. Photoelectric and electronic timing controls also are reviewed in detail, with illustrations. Circle No. 148.

Pressure-Sensitive Labels

Allen Hollander Co. Inc. offers a packet containing 15 specific case

studies of applications of its pressure-sensitive labels. Sample labels, as well as illustrations, accompany the descriptions. Features and details of labels also are listed. Circle No. 149.

Aerosol Packaging

Fluid Chemical Corp. offers its new Facilities Catalog covering its contract packaging facilities for aerosol containers. Inplant operations and packaging practices are discussed. Circle No. 150.

Humidifying Equipment

Abbeon Supply Co. announces Bulletin No. 492, which illustrates and describes its humidifying equipment and also contains technical information concerning humidification, saturation or 100% humidity, and relative humidity. These are explained and are related to inplant operational problems. Circle No. 151.

Hot Melt Adhesives

United Shoe Machinery Corp. offers literature on its Thermogrip, an adhesive in coil form which melts when heated for application. Details and use of this coil form adhesive are explained. Line drawings illustrate its Model A applicator for using this adhesive. Circle No. 152.

Unit Packaging Equipment

Conapac Corp. has a 4-page folder describing its Model B and Model K Roto Wrap equipment. Model B handles packages from ¾" to 6" wide and from 1-9/16" long upward. Model K handles strip packaging of products up to 1" in dia. Specifications of each machine are included in the folder. Circle No. 153.

Milk Cartons and Fillers

Mojonnier Associates Inc. has an eight-page brochure describing its Plastic-Pack milk cartons and filler machines for milk and similar products. Cartons consist of an outside carrying carton of cardboard and a liner of "low-pressure" polyethylene. Further characteristics and specifications of cartons are listed. Also described are models of automatic fillers, available to fill all sizes of Plastic-Pack cartons. Specifications and pictures of machines are included. Circle No. 154.

Speed Reducers

Metron Instrument Company offers Bulletin No. 98, a four-page illustrated bulletin describing its Bantam speed reducers, which have a maximum power output of 0.1 hp at the low speed shaft. Standard units and units with an anti-backlash feature are described. Each kind is available in over 400 fixed ratios, Metron says. Circle No. 155.

Pressure-Sensitive Tapes

Mystik Adhesive Products offers a 68-page handbook, "Manual of Pressure-Sensitive Products," which describes ways to use pressure-sensitive tapes. It includes a four-way tape finder, which enables a user to select tapes. Circle No. 156.

How barrier coatings enhance packaging laminations

(Continued from Page 13)

aging, it must always be taken into account.

It is interesting to note that increased packaging costs often make possible reduced ingredients costs. For example, use of a laminated tight wrap for soap can make it possible to reduce the amount of perfume required. In a sealed soap bar it is possible to pay for part of the cost of the wrap through reduction of required perfume.

Simulate Flavor, Odor

The protectiveness provided by the packaging material often is so complete that it is necessary to furnish a simulated odor in the packaging material itself. A supplier of packaging materials may be requested to match the perfume of the product with perfume in the ink, so that the exterior of the package exudes the aroma of the product in the package. This is not only true of soap products but also certain food items, such as crackers, cookies, or cereals.

Basically a material should be a good barrier to outside odors. In addition, it should protect against grease, including movement both in and out. The same is true of flavor both in and out, as well as moisture, gases, and deleterious materials. This enumeration is not definitive, but is merely descriptive of the types of problems encountered in working out a particular packaging material combination.

At the same time, economic as well as protective factors influence the selection of a given material. For example, one can eliminate some materials by using certain others whose total is less costly and less involved than the separate pieces used. Likewise, it might be possible to go from a cut label to a roll feed and high-speed labeling operation.

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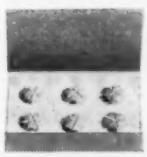

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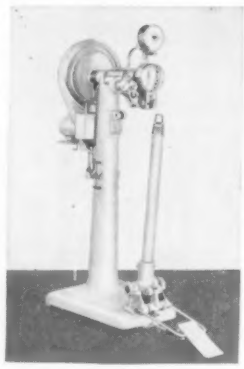
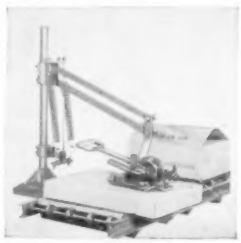


MID-STATES BOTTOM STITCHER MACHINE staples carton bottoms up to 72" wide, 40" deep. Effective on board stock to a maximum thickness of 3/8". Single foot pressure on saddle plate brings Bottomer Post into position. The famous "Tip-Toe" contact on electric switch starts and stops stapling. *Stapling Head Arms in 12, 30, 36 inches in length. Straight Arms and Sword Arm types also available.*



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AMA offers new packaging literature

American Management Association announces publication of booklets Nos. 49 and 50 of its packaging series. These represent publication of material presented at AMA's recent National Packaging Conference. Most of No. 49 is devoted to a study of the organization of a packaging committee, as carried out at Ayerst Laboratories, Inc., International Harvester Company, and Colgate-Palmolive Company. Numerous organization charts and tabular presentations accompany these discussions. This booklet also contains case histories of improved packaging through market research.

Booklet No. 50 contains material on the measurement of printing quality, the packaging of "difficult" products (such as engine parts and panoramic windshields), and a discussion of the synthesis of an adhesion policy. The latter contains numerous charts and engineering analyses in the form of line drawings — to accompany the text.

Both booklets are available from the Packaging Division, American Management Association, 1515 Broadway, Times Square, New York 36, New York. Members and non-members of AMA should contact the organization regarding availability and prices.

Index of Advertisers

A-B-C Packaging Machine Corporation 34
American Viscose Corporation ..... inside back cover
Bakelite Co. Div. Union Carbide and Carbon Corp. 8
Battle Creek Packaging Machines, Inc. 35
The Connecticut Hard Rubber Co. 36
Crossett Paper Mills 27
Crown Cork & Seal Company, Inc. 6-7
Dobeckmun Co. 5
Dow Corning Corporation 34
J. L. Ferguson Co. 33
The Filler Machine Co., Inc. 39
The Goodyear Tire & Rubber Co. 3
Hinde & Dauch 10
Industrial Marking Equipment Co., Inc. 39
R. A. Jones & Co., Inc. ..... outside back cover
Markem Machine Company 30
Mid-States Steel & Wire Co. 42
Packmaster Sales Co. 37
Riegel Paper Corp. 17
Scandia Manufacturing Co. ..... inside front cover
Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp. 1
Standard-Knapp Div. Emhart Mfg. Co. 9
Wrap-Ade Machine Co., Inc. 41

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1791 West Howard Street, Chicago 26, Illinois

What we think

When one looks at the progress of packaging in his own company it is easy for him to take a comfortable but altogether limited view of it all. Far too much defensive thinking gets into the picture. The trouble is that attainments such as savings due to packaging cost reductions, improved product protection, and package innovations contributing to increased consumer convenience, tend to lull many a packaging specialist into security.

We hear packaging called one of the last frontiers of cost reduction. There is plenty of evidence to support this view. In fact, there is so much of it that often a packaging engineer's specific successes obscure his broader view of the future of packaging and his part in it.

When translated into dollars equal to so much profit or to money borrowed without interest, technical and operational packaging accomplishments seem to be contributing to the growth of a company. Unfortunately, this is not often the case; many companies that fancy themselves as being "growth situations" are not that at all. They merely are riding the waves of prosperity, and are serving markets that are growing simply because of such factors as the increase of population.

The position of packaging within a company often parallels this situation. The packaging specialists are doing a notable job in efficiently and effectively packaging their company's wares, but seldom do they create anything distinctly new. This is the crux of the defensive thinking, which we say has got to go — to be replaced by a vigorous, affirmative approach.

To understand the difference between defensive and offensive thinking, perhaps we should look at the distinction between a company that is actually a growth organization and one that merely appears so. In a nutshell, the criterion is largely that of initiative. Some companies make their own growth; they actively create new markets by developing new products or distinctly new demands for existing or modified products. Other companies report growing sales volumes, but a close look discloses that they merely are selling more of the same widgets to basically the same market, although it is now a larger market. No doubt many of these companies will challenge us on this point and contend that they really are growing. We admit that the distinction between building a new market and taking a ride on an existing one is not a line but a shadow. But we stand on our assertions just the same.

Perhaps the best way for any packaging man to clarify his own thinking about company growth is to talk to some of the thoughtful leaders and forward thinkers in the securities and investment banking fields. Even when he cuts through the Wall Street jargon, and disregards for the moment the close cases, we think he will find that a true growth company generates this growth from within itself, independently of such externals as a rising population.

All this puts the men directing the packaging function in a strategic position. More and more a product is increasingly dependent upon its packaging for its success in the market and its acceptance by consumers. So many products are alike, with only subtle differences. This should challenge the men packaging these products to find new applications and create new possibilities through different, improved packaging.

It boils down to this: To make the most of his function the packaging man must do more than merely come up with the best way to contain a product. He must look beyond his role as a savings-producer. He must take an active, forward part in new product development and application.

Usually the packaging function embraces two vital kinds of thinking and talent: The advance-thinker, ever dissatisfied with existing things and methods, and the practical producer, who follows in the wake of the advance thinker, and figures out how to make it all work. And as packaging becomes increasingly a top management function, there is a third element — the balance wheel, the referee who settles the opposing views of the too-radical development people and too-practical production folks. As a result, the packaging arm of the company is coming more and more to embrace all three of these factors.

Our point is that the packaging man is not going to make the most of all this until he clearly recognizes his role as an *active* one. When he comes up with advanced ideas backed with production practicalities that can lead his company into new products and new markets, he will be able to sell it all to top management. But his state of mind is the key to the situation.

In short, his work with new films, laminations, board or linings and his stepped-up machine speeds must focus not alone on doing the best packaging job on products already created — however vital this task may be today. Rather, he also must think in terms of tomorrow, to be alert to new product possibilities and packaging applications that will create new markets. The rewards are there — for the men and companies who make the most of self-development and self-direction. And spearheading all this growth should be the technical and operational packaging man.

Bruce Holmgren

Editor

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